

Japan and the Dutch 1600–1853

Grant K. Goodman

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Preface

This work first saw the light of day many years ago at the University of Michigan under the guidance of Professor John Whitney Hall. It received its original publication by E.J. Brill, Leiden, in 1967 as a monograph, *Monographies du T'oung Pao*, volume V. Since that time *The Dutch Impact on Japan (1640-1853)* has enjoyed a certain currency as a standard work on a subject of special interest to historians of Japan and of general interest to those persons attracted by examples of cultural interchange.

However, since its publication so much new information has come to light and so many new ideas have been advanced about the nature and scope of Dutch studies in Japan that there has been a great need for a thorough revision and rewriting of the original volume. Unfortunately the opportunity to do this did not arise for a decade. But with the generous support and assistance of the Netherlands Institute for Advanced Study in the Humanities and Social Sciences, I was enabled to spend a year at the Institute in Wassenaar, Holland, devoting my time and effort to that revision and rewriting. While NIAS bears none of the responsibility for the work which has resulted, it certainly deserves my most profound gratitude.

Thanks are also due to Professor Charles Sidman, chairman, Department of History, University of Kansas who made it possible for me to be away during 1976-7, to Professor Frits Vos, retired chair of Japanese Studies, Leiden University, whose kind encouragement of my work has never flagged, to Professor Yoshida Tadashi, Sendai University, whose stimulating presence in Holland during 1976-7, made untold contributions to my thinking, and to Miss Torii Yumiko, Sophia University, whose expert advice was indispensable.

Grant K. Goodman

I

Introduction

It is generally believed in the West that the period from 1640 to 1853 was an era of complete isolation for the empire of Japan, a nation suddenly awakened from over two centuries of slumber by the arrival in 1853 of the American Commodore Matthew Perry's 'black ships'. However, although during those years foreign intercourse was at an almost irreducible minimum, Japan did, in fact, maintain commercial ties with two great powers of the time, one the East Asian 'celestial empire' of China and the other the great European maritime trading nation of Holland. It is with the latter relationship that this volume will deal in an attempt to discover what the effects were of this single minute contact with European civilization on the internal society of Japan.

In this study it has been necessary to consult extremely diverse sources whose opinions of the scale and results of the Dutch-Japanese interchange have been at wide variance. The principal concern of this work, depending heavily on Japanese sources, is to describe and analyse the ways in which information coming into Japan from the West through the Dutch was assimilated and utilized by the Japanese. Therefore, *Rangaku* (Dutch learning) will be traced here as a facet of Japanese intellectual history and as one of a variety of trends of thought which emerged among the Japanese educated elite during the Tokugawa¹ Period.

This study is organized by means of a combination of the chronological and the topical. The introduction is concerned with the historical milieu in which Dutch studies were nurtured and with an attempt to define, at least in general terms, what exactly is encompassed by the concept of 'Dutch studies' in Japanese history. The first section of the book deals with the Dutch themselves and with their particular situation in Tokugawa Japan, with emphasis on their position as transmitters of Western knowledge. The roles and functions of the official interpreters at Nagasaki are then described, and their pioneering efforts as students of the Dutch language are detailed. Then, a series of chapters devoted to the move of the focus of interest

in things Dutch from Nagasaki to Edo follows. The encouragement given by the shogunal government to those who took up Western studies is explained, and the important contribution of physicians to the growth and development of interest in information from Europe is made clear. Parallel infusions of influences from the West into the astronomical realm are noted. The special importance of Otsuki Gentaku to the spread of *Rangaku* is then examined with attention given to the significance of the founding of the government's translation bureau in 1811. Next, the rise of Western learning in various domains and in several private schools is discussed. Finally, as several foreign powers began to press Japan more closely towards the middle of the nineteenth century, the part played by Dutch scholars (*Rangakusha*) in the emerging controversies about the validity of traditional Tokugawa policies is recorded. The conclusion suggests that to a very great extent Dutch studies in Japan were a superficial phenomenon seriously limited by the Neo-Confucian philosophical commitment on the part of educated Japanese, by the prescribed confines imposed by an overweeningly powerful government, by the unsystematic method by which information from the West entered Japan and by the mercantile preoccupation of the Dutch who never saw themselves as cultural intermediaries.

The initial contact between the Dutch and the Japanese came in the year 1600, the same year in which the Battle of Sekigahara brought an end to a bloody civil war and confirmed the supreme power of the Tokugawa family who were the victors. With the accession to power of Tokugawa Ieyasu (1542–1616),² the first Tokugawa shogun, the principal policies by which Japan was to be governed for over two and a half centuries were outlined. The basic premise of this new organization was that the daimyo or the hereditary heads of the existing feudal domains were to acknowledge their submission to the central government of the Tokugawa Bakufu³ which established its capital at Edo. Each daimyo remained in local control of his people and property, a relationship which was not in theory to be disturbed so long as the Tokugawa regime was secure. Thus, political authority in Japan was divided among a centralized, bureaucratized military regime (the shogunate) and some 250 bureaucratized feudal domains.

Under this system of somewhat divided responsibility, much of the programme of the Bakufu was aimed at preventing revolt. One of the preventive measures taken by the authorities to attain this end was the geographical distribution of the *han* (territory governed by a daimyo)

by means of a strategic disposition of domains among those feudatories who submitted only after the Battle of Sekigahara (*Tozama daimyo*) and those who had sided with Ieyasu from the beginning (*Fudai daimyo*). Another policy with the same purpose was the system of alternate attendance (*sankinkotai*) which obliged all the daimyo to reside alternately in their domains and in Edo and to leave their wives and children at the capital as hostages. A third protective device was the *metsuke* system which was a kind of intelligence corps and which in time of peace conducted continuing surveillance of all the activities of the daimyo and their followers. Accordingly, much of the energy of the Tokugawa governing class was devoted to the consolidation of its power and to the devising of instruments for its preservation.

In line with this policy of self-perpetuation the Bakufu not only was interested in raising revenue and keeping order but undertook to regulate moral standards, to control education and to prescribe popular behaviour. The shogunate was dependent for its existence on the support of a military caste (*bushi*) which was carefully systematized from the daimyo at the top to the lowest samurai at the bottom and whose *modus vivendi* was governed by a strict code based on the Confucian concept of loyalty. Although the various sects of Buddhism continued to be tolerated as the popular religion,⁴ official Tokugawa patronage was given to orthodox Confucianism with its firm foundation of discipline and obedience.

The official philosophy was the Neo-Confucianism of Chu Hsi (1130–1200), a leader of the Sung (960–1279) philosophical renaissance in China. This Chu Hsi brand of Confucianism had great appeal for the military rulers of Japan because it fitted the precepts of the ancient sage into a metaphysical framework and preached that by comprehension of the laws of the universe virtue might be understood. This was so, according to Chu Hsi, since the relationships of natural phenomena are paralleled in the relationships between individuals, particularly that of sovereign and subject. The Neo-Confucian system seemed well suited in its application to authoritarian Tokugawa rule. It emphasized loyalty and orthodoxy and was essentially conservative in tenor. Since the founders of the Bakufu were themselves a new phenomenon on the Japanese political scene, they hoped also to derive from their official sponsorship of the Neo-Confucian philosophy not only guiding principles by which they could rule the country but a historical and ethical justification for their own position. By encouraging and giving support to scholars of Chu

Hsiism, the shogunate hoped to promote a spirit of learning while paradoxically discouraging free inquiry.

Moreover, official propagation of Chu Hsi Neo-Confucianism became an essential part of the Tokugawa effort to indoctrinate the literate sector of Japanese society. For Neo-Confucian philosophy, through its all-embracing nature, indicated by its concern with ethics, economics and government as well as by an inflexible cosmological system, offered a complete and authoritative concept of the world. Once adopted, therefore, Neo-Confucianism provided both the form and the ideology for the maintenance and perpetuation of the Bakufu and its samurai-dominated social organization.

By about 1700 cracks in the bulwarks of the well-ordered military bureaucratic state were beginning to appear. The rigid hierarchical class structure of soldiers, farmers, artisans and traders was weakening in the wake of the relaxed discipline of a peaceful era. The land-based economy of a nation dependent on a single crop – rice – fluctuated between surplus and famine. A growing commercialism accompanied the rise of cities such as Edo and Osaka whose development was speeded by the comings and goings of the daimyo and their retinues. Despite the low position of traders in the Tokugawa class system, because of their importance to the society, particularly as rice brokers for the daimyo and their retainers, the number of *chonin* (townspeople) increased steadily, and they developed many of the social and economic characteristics of the European bourgeoisie.

Also, from the eighteenth century onwards as scholarly activity increased throughout a prosperous and peaceful Japan, new currents of thought, centred principally in the major urban areas, began to emerge. By their nomenclature of *gaku* or 'learning' these trends were recognized as representing certain 'schools' and as evidencing in each instance a following of substance and significance. Shinto revivalism (*kokugaku*), critical Confucianism (*kogaku*) and Western 'scientific' study (*Rangaku*) were the principal new intellectual undertakings which appeared alongside the official orthodox Chu Hsi Neo-Confucianism.

In so far as the study of information from the West was concerned, it had its origins some fifty years prior to the Tokugawa Period. Three Portuguese castaways reached the shores of the southern coastal island of Tanegashima in 1543 and within a very few years thereafter Lusitanian ships were trading at several ports in Kyushu. In 1549, St Francis Xavier and two other Spanish Jesuits arrived in Japan in order

to spread the doctrines of the Catholic faith. This began what is known to Western historians today as the 'Christian Century'. While not detailing here the course of the proselytizing efforts of the emissaries of the papacy, it would be sufficient to say that the approximately one hundred years of Christian-Japanese relations was an era marked by considerable strife and dissension which terminated in the firm resolve of the Bakufu to eradicate the despised religion forever from the island empire. For, despite the advantages of trade with the foreigners, the fear of the government that native converts might have divided political loyalties and might even facilitate an invasion by a European power was conviction enough to ban both Christianity and its Iberian propagators.

At the beginning of the so-called *sakoku* (closed country) era which lasted from 1640 to 1853 only the Dutch remained from among the Occidentals who had had contact with Japan prior to that time. Consequently knowledge of the West which entered Japan during the *sakoku* period eventually came to be known as *Rangaku* or Dutch studies. During the Tokugawa Period there were four types of name for the study of the West: *Nambangaku* or *Bangaku*, *Orandagaku* or *Rangaku*, *Seiyogaku* or *Yogaku*, and *Taiseigaku* or *Seigaku*. The terms *Namban* (southern barbarian) or *Ban* (barbarian) were appropriated directly from the Chinese at the time of the arrival of the first Westerners in Japan. The name 'southern barbarian' had its origin in the Chinese-Confucian concept of China as the Middle Kingdom surrounded on four sides by so-called barbarians, that is those peoples who had not been blessed with the benefits of Chinese civilization. Thus, when the Portuguese and Spaniards reached China, it was believed that they had sailed from some indeterminate area to the south and so were called 'southern barbarians'.

The Japanese terminology *Namban* or *Ban* continued in official usage up to the end of the shogunate. For example, the Bakufu established the Bانشowagegoyo for the translation of foreign books in 1811. Subsequently, in 1855 it became the Yogakusho and in 1856 the Bانشoshirabesho. As late as 1839 a group of scholars specializing in the West called themselves the *Bansha* (Barbarian Group).

The actual word *Rangaku* seems to have come into use among the Japanese in the 1770s originally to differentiate those individuals who were primarily scholars with a particular interest in the West from the Nagasaki interpreters. At first among the *Rangakusha* themselves the definition of Dutch studies was narrowly construed as the scholarship

of Holland. However, it soon became clear that *Rangaku* in Japan had a much broader meaning, namely all of the knowledge and techniques from the West transmitted through the medium of the Dutch language. In short, since by chance commerce during the *sakoku* era was only permitted with Holland from among the various Western countries which had come into contact with Japan, any European information which reached Japan came via the Hollanders. Accordingly, *Rangaku* became a generic term which might more precisely have been called *yogaku* (Western studies). However, because that information from whatever European source had to filter through the Dutch tongue, it is not surprising that *Rangaku* was by far the prevalent appellation.

In the pages that follow it will quickly become evident that the mainstreams of *Rangaku* were two: (1) medicine and (2) astronomy. The first included botany, pharmacopoeia, mineralogy, chemistry, physics and zoology – all deriving in some way from Western-influenced medical science. The second concentrated heavily on calendrical science but ultimately included surveying, cartography and geography. The practical considerations which attracted the Dutch scholars to medicine and astronomy involved certain pressing societal needs, namely the prolonging and saving of lives in the former instance and the correction of the calendar to improve the agricultural cycle in the latter.

Moreover, that the *Rangakusha* concentrated their efforts on those aspects of Western technological skill which had the most obvious immediate application in Japan was also the result of both the encouragement and the strictures of the Bakufu. For the Tokugawa authorities recognized the potential value of practical scientific knowledge obtainable from Europe but at the same time rigorously curbed any inquiries into European history, philosophy, law, literature or religion. Intensely fearing any repetition of what was seen as the disruptive effect of the introduction of Christianity into Japan, the Bakufu sought to set specific limits on the scope of Western knowledge in Japan. Since almost all of those who became *Rangakusha* were themselves either government employees of some kind or had imbibed at the font of Neo-Confucian indoctrination or were desirous of being accepted into the circles of those who had had that privilege, there was not only no objection to the kind of dichotomy which the authorities imposed on Dutch studies, but those scholars who took up things Western were often well ahead of

the government in proclaiming their Neo-Confucian orthodoxy.

As will be described in this volume, Dutch studies in Japan had certain unique characteristics. *Rangaku*, for example, was never a 'grassroots' movement and did not reflect any demands from below. Instead, demands from above and, in particular, such economic necessities as the desire to improve agricultural production, were often the principal stimuli of Dutch studies. The very mainstreams of medicine and astronomy are indicative of the support which the Bakufu and the daimyo gave to the investigation of Dutch techniques by official physicians and official astronomers in their respective fields. However, even though the ruling authorities came to recognize the practical value of skills learned from the Hollanders, they were to continue to be extremely uneasy about the spread of *Rangaku* among the general populace. Governmental limitations on the kinds of research and publication which were permitted to the Dutch scholars clearly reflected such fears.

The importance given to official control of *Rangaku* was similarly evident in Bakufu employment of astronomers knowledgeable in certain aspects of Western astronomy. These astronomers served a number of official purposes. First, since the traditional function of making the calendar had always been assigned to court astronomers in China and in Japan, the establishment at Edo of an astronomical bureau with greater competence in calendrical science than the traditional imperial astronomers at Kyoto provided the shogunate with an important bulwark for its continued claim to political and cultural predominance. Second, as Tokugawa officials who supposedly knew Dutch, these astronomers were very useful to have on hand at Edo where in times of emergency they could be pressed into service. Third, under government supervision certain of the astronomers were encouraged to study Russian and even Manchu in order to provide the Bakufu with expertise in relation to problems emerging on Japan's northern frontiers. Fourth, by utilizing the astronomical bureau as an official translation centre, *Rangakusha* could, on the one hand, be rewarded with government jobs and could, on the other hand, be supervised and controlled in accordance with the shogunate's will.

Moreover, as will be examined below in some detail, since the efforts of the Edo astronomers were perforce focused on making better calendars, these official astronomers were neither the source of the introduction into Japan of new theories of astronomy such as heliocentricity nor did they indulge in any semblance of experiment-

alism. Their calendar compilation, for example, continued to be based on the traditional Chinese model to which they were simply adding a few elements of Western astronomy. Such European concepts as Copernicanism or Newtonianism were, in fact, made known in Japan by the work either of the Nagasaki interpreters or of private amateur astronomers. However, even these men had great difficulty understanding the theories with which they were working, especially in the light of the belief in the Chinese dualist philosophy, i.e. the doctrine of the positive and the negative. According to that cosmology, since heaven was positive and earth was negative, in diametric opposition to the Copernican theory, heaven was round and moved while earth was square and quiescent. Thus, given the very particular intellectual environment into which Western astronomy was introduced, it is not surprising that the Japanese comprehension of its theoretical basis was minimal or that its real influence during the Tokugawa Period was limited.

Therefore, the principal obstacle to the maturation of Dutch studies was that even its most devoted practitioners viewed it, as did the Bakufu, as a utilitarian technological supplement to a well-ordered, harmonious, intellectually 'satisfying' ethical system derived from Chu Hsi Neo-Confucianism. Thus, unlike *kogaku* or even *kokugaku*, *Rangaku* was not a system of knowledge constructed on the basis of a single world-view. As the chapters that follow will recount, it was basically a rather random accumulation of certain quasi-scientific and technological information acquired from Western Europe through restricted contact with the Dutch. Nevertheless, the method of that acquisition as well as its scope are of more than sufficient interest to justify an investigation of this unusual facet of Tokugawa intellectual history.

II

The Dutch at Hirado

As has been stated in the introduction, after 1640 Holland was the only European state with which Japan had any direct contact until the so-called 'opening of Japan' by the United States in 1853. Since this volume deals with the effects in Japan of a relationship of over two centuries with the Netherlands, it is perhaps useful to describe at the outset the development of Dutch tenure and the opportunities of the Japanese for direct contact with the Hollanders.

Within thirty years of the outbreak of Holland's revolt from Spain which began in 1556, the burghers of the United Provinces had created a bustling commercial economy and along with it an ever-increasing navy and merchant marine. This spurt of Dutch maritime activity was given added impetus when in 1594 Philip II (1527-98), king of Spain and Portugal, closed the port of Lisbon to his 'rebel subjects' in an attempt to cut them off from the then lucrative Portuguese commerce. As an immediate and perhaps unforeseen result of this ban the pioneer expedition of Dutch ships to Java and Sumatra was formed, and Cornelius de Houtman, an escapee from a Portuguese prison, was given command of it. De Houtman's return to Holland with his ships richly laden with the rare commodities of the Indies aroused tremendous enthusiasm for further voyages.

Six separate companies emerged for the purpose of sponsoring trade with the Orient, and in 1598 some twenty-two Dutch vessels set sail for the Far East. One of these, *de Liefde* ('Charity'), captained by Jacob Quaeckerneck and piloted by the Englishman, Will Adams, having been blown off its course by violent storms and buffeted by the pounding seas, reached Japan at Bungo¹ on the eastern shore of Kyushu on 19 April 1600.² Despite the antagonistic intervention of the Portuguese and the Jesuits, the Hollanders were permitted to remain in Japan. News of the fate of these castaways reached Rotterdam in 1601, when Olivier van Noort of Utrecht returned from his globe-circling voyage.³

This report of the arrival of Dutch seamen in Japan immediately aroused interest in the Netherlands in the possibility of opening up

trade with the then most remote outpost of Asian civilization. Two subsequent events greatly facilitated the opening of commercial relations between the two states. In 1602, under order of the States General of the Dutch Republic the rival companies which had been sailing to the Far East were amalgamated, and the Dutch East India Company (*De Vereenigde Oost-Indische Compagnie*) was founded as a government-supported corporation with headquarters in Amsterdam and a seventeen-man governing board. Its purpose was to acquire commercial rights and colonial territories for Holland wherever possible. As an officially sponsored organization, its powers included sole responsibility for the conduct of overseas trade, the use of armed forces, the construction of forts and factories, and the signing of treaties. Then in the spring of 1605, Quaeckerneck, the aforementioned captain of *de Liefde*, was allowed to depart from Japan bearing a licence from the shogun Tokugawa Ieyasu for the Dutch nation to trade with Japan.

In the meantime Admiral Pieter Willemisz Verhoeven left Texel for the Indies in December 1607 with a fleet of 13 ships, 1,900 men and 377 pieces of artillery. The admiral had received instructions to send at least one of his ships to Japan in order to deliver a letter to Ieyasu from the ruling Prince Maurice of Orange (1567–1625) and to establish a permanent Dutch factory. On 6 July 1609, two ships, *Rode Leeuw met Pijlen* ('Red Lion with Arrows') and *Griffoen* ('Griffin'), anchored in the harbour of the quiet fishing village of Hirado.⁴ Abraham van den Broeck and Nicolaes Puyck, the commercial envoys aboard the ships, were immediately sent by the local daimyo to pay their respects and present their letters to Ieyasu then in retirement at Shizuoka. The Hollanders were well received, and permission was granted them through a written charter to open a permanent trading post at Hirado.⁵

During the years since the coming of the first Dutch ship, the Spaniards and Portuguese, who at the time were not only monopolizing Japanese trade but who had great influence with certain Tokugawa government officials as well, had lost no time in trying to arouse the suspicion of the Japanese against the intruding Hollanders. In order to refute and to counteract these charges the Dutch representatives told how Holland had freed itself from the yoke of Roman Catholic Spain and that Spain and Portugal both had political, religious and even territorial designs on Japan. The Bakufu believed the Dutch envoys, decided Holland was not a Christian country, at

least not to the extent of the Iberian nations, and sustained the original permission to trade with Japan.

Following the granting of official trading rights to the Hollanders the tension between the Japanese, on the one hand, and the Spanish and the Portuguese, on the other, increased tremendously. This was not only because of Dutch ascendancy but was even more a result of the 'Christianizing' activities of the two Latin powers. The number of converts was amazingly large, some estimates going as high as two million, and the Tokugawa shogun whose recently acquired power depended so much on the loyalties of the individual daimyo greatly feared the defection of converted lords and saw these missionary efforts as detrimental to the safety of the state. Thus, restrictions on Christianity began in 1612 with a shogunal ban on the propagation of Christianity, and in 1616 another decree ordered the expulsion of Christian missionaries, the end of free residence for Westerners in Japan and the restriction of foreign trade to the two ports of Hirado and Nagasaki. Further, as a consequence of suspected conspiracies on the part of priests from the Philippines, the Spaniards were completely banished from Japan in 1624, and no Japanese Christian was to be permitted to leave the country.

The Portuguese were placed under careful restriction and surveillance after 1623, and from 1625 on neither Portuguese persons nor ships could stay in Nagasaki but rather had to come and go every year. In 1636, the only legal site of Portuguese trade was moved into Nagasaki⁶ harbour on to the artificially constructed islet of Deshima, which had been built on order of the Bakufu through the contributions of twenty-five local merchants (*Deshima chonin*). Here the Portuguese were confined, across a small stone bridge from the site of their former factory. Their contact with the Japanese was to be limited strictly to matters of trade, and under the new regulations all cargoes were to be sold at fixed prices only to officially licensed merchants from specially designated areas. On 23 June 1636, the shogunate issued new instructions to the authorities at Nagasaki providing that under pain of death no Japanese vessel was to go abroad, that any Japanese citizen residing abroad who returned to the mother country was to be killed and that all descendants of the Portuguese were to be banished forever. In accordance with this ordinance, in the autumn of 1636 two Portuguese galliots took to Macao 287 persons with their property amounting to over 6.5 million florins.

The only other European state which had established commercial

relations with Japan was England. Shogun Ieyasu had also granted Britain a charter in 1613 to maintain a factory at Hirado. However, the English voluntarily abandoned their foothold in 1623 since they felt that trade with Japan 'could never become an object of importance' to their manufacturers or a market for their export trade on the grounds that 'the only returns must be in copper, an article produced by our own mines to the full extent of home consumption and foreign exportation'.⁷

In the years 1631–6, the Dutch, too, encountered increased difficulties at Hirado. They had previously made a serious miscalculation when at the death of Ieyasu they petitioned anew for confirmation of the trading rights which he had conferred upon them. This was not only a violation of the respect due to the new Shogun Hidetada but was considered an insult since asking him to reaffirm an action of his father implied that an unfilial Hidetada might alter or rescind it. The Dutch were, accordingly, punished for their mistrust by subsequent restriction of their privileges.

Some of this animosity may also be attributed to the ill-fated attempt of the Hollanders to establish their supremacy in Formosa where their imperialistic ambitions came into direct conflict with those of the Japanese. Fort Zeelandia in southwestern Formosa had been a Dutch outpost since 1624. In 1628, Pieter Nuyts was put in command of the settlement. This proved to be an unfortunate choice since in previous years this same Nuyts had gone on one of the Dutch missions to Edo where he considered his reception to have been discourteous, and now he awaited an opportunity to even the count with the Japanese.

The chance soon presented itself when two Japanese ships stopped at Fort Zeelandia en route to Indo-China. Nuyts ordered their yards and rudders to be removed and in so doing caused them to lose the advantage of sailing with the monsoon. The Japanese turned on Nuyts, seized him and only set him free after he apologized, indemnified them for the losses suffered during a year's detention and gave them five hostages to be consigned to imprisonment in Japan where two of them subsequently died in 1631. When the leader of this Japanese group reported the incident to Edo, several Dutch vessels were impounded, trade at Hirado was suspended, and a demand was made for the surrender of Nuyts himself to the proper authorities. When the latter request was not complied with, the Japanese insisted that as recompense Fort Zeelandia should be ceded to them by the

Dutch. Thus pressed, the Hollanders induced Nuyts to go to Japan and to surrender himself, which he did in November 1632. Only after his incarceration was trade resumed, but new restrictions were soon in evidence. Nuyts's imprisonment without trial lasted until July 1636 when his release was finally obtained after many entreaties and gifts from his countrymen.

Meanwhile Dutch trade had undergone new restrictions. In 1633, the Dutch were ordered to sell all their raw silk only at the fixed price applied to the Portuguese at Nagasaki, and were told that their other goods could not be sold henceforward until the fixed price for raw silk had been determined. When the chief of the factory (*opperhoofd*), Nicolaes Koeckebacker (at Hirado from 20 December 1633 to 3 February 1639),⁸ tried to evade these instructions, he was severely admonished by the daimyo of Hirado. Increasingly, thereafter, the Dutch found their situation at Hirado more and more circumscribed by a variety of restrictions, both economic and personal. Nevertheless, as Koeckebacker relayed his complaints to Batavia (the Asian headquarters of the Dutch East India Company, present-day Jakarta), he was constantly advised to be moderate and responsive to changing Japanese requirements. For example, in 1638, the governor-general wrote Koeckebacker:

You should not get into trouble with the Japanese, and you have to wait for good time and with the greatest patience in order to get something. Since they cannot stand being retorted, we should pretend to behave humbly among the Japanese, and to play the role of poor and miserable merchants. The more we play this role, the more favor and respect we receive in this country. This has been known to us through years of experience.⁹

In 1636, the Dutch governor-general reported from Batavia that the Portuguese at Macao had rendered honours to certain Portuguese martyred by the Japanese. He hoped such news would prove to the disadvantage of the already odious Portuguese and, accordingly, would benefit the Dutch. However, the daimyo of Hirado told the head of the Dutch factory that this matter was already known to the Japanese and could not bring the Hollanders the least advantage. The following year, 1637, a new edict forbade any foreigner to travel in Japan lest Portuguese with Dutch passports enter the country.

Finally the so-called *sakoku* ('closed country') edict of 1639 put an end to almost a century of Japanese-Portuguese relations.¹⁰ According to this decree any Portuguese ships coming to Japan in the future were to be burnt together with their cargoes, and everyone on board

them was to be executed. The reasons given for this complete rupture were that the Portuguese, in defiance of orders to the contrary, had continued to bring missionaries to Japan, that they had aided and abetted the actions of these missionaries and that they bore responsibility for the bloody 'Christian' rebellion of Shimabara in Kyushu.

The Shimabara affair was, as it developed, the climax to the struggle between the Dutch and the Portuguese for commercial supremacy. At the same time it prompted the Tokugawa government to close the country to all intercourse with Westerners with the exception of a very limited trade with the Hollanders. Although the Japanese accused the Portuguese of fomenting the Shimabara uprising, it seems more correct to say that desperate economic conditions and political oppression in northwest Kyushu were the real causes. It was not long, however, before the persecuted and proscribed Japanese Christians joined in the fray. It then took on the aspect of a kind of holy war, with the rebels imbued with a fanatic religious zeal and with the government determined to expunge completely from Japan this foreign creed which was seen as a constant source of unrest.

As government forces pushed ahead, the rebels retired into the stronghold of Hara Castle where they held out against repeated attacks. It was at this point that the shogunate decided to seek the aid of Dutch artillery and at the same time to test the loyalty which these foreigners had been so loudly professing since their arrival in Japan. Koeckebacker, still head of the Dutch factory, was first 'requested' to send five heavy guns with ammunition to shell the castle walls. Hesitating to comply he was 'advised' by the Nagasaki *bugyo* (magistrate) and then 'ordered' by the daimyo of Hirado to send Dutch ships into the roadstead at Shimabara for service there. Still procrastinating, Koeckebacker hurriedly sent one of the two available ships to Formosa and then dispatched the other, *de Rijk* ('Hoarfrost'), carrying 20 guns, to the waters off Hara Castle where it arrived on 24 February 1638. Although according to Koeckebacker's own account of the situation he felt nothing important could be accomplished with his guns, between 24 February and 12 March the Dutch fired 426 rounds into the Hara stronghold. Suddenly on 12 March, they were thanked and told to withdraw. The Japanese had discovered that both the food and the ammunition of the rebels had given out, and in a final assault on the fortress by loyal shogunate troops an estimated 37,000

survivors were annihilated in what has come to be known historically as the Massacre of Hara.

For the purposes of this volume the most important phase of the Shimabara rebellion is the participation of the Dutch on the side of the 'anti-Christian' Japanese. This breach of 'Christian' conduct on the part of the Hollanders was to be the subject of widespread condemnation by their fellow Europeans for centuries. The most frequent apologia of the Dutch for having taken part in this fray is that this was after all a civil war and not a religious war, though they did not deny the Christianity of most of the insurgents. The real apologia, if one be necessary, probably lies in the not irrational dread of the Hollanders that they might pay with their own lives for disobeying a mandate sanctioned by the shogun. It is likely that this very compliance, by convincing the government of the assertion that, though the Dutch were Christians, their Christianity was not the Christianity of the Portuguese, secured their exemption from the exclusion act of 1639.

During the years 1638–40 Dutch trade was attaining unexpected heights with the figures running as high as 4 million *gulden* in 1640.¹¹ However, when François Caron, the new chief at Hirado (*opperhoofd* from 4 February 1639 to 24 October 1641), arrived at Edo to pay his respects in 1639, he was received with disdain. It seemed that the government of the third Tokugawa Shogun Iemitsu (1603–51), who was himself violently anti-Christian and a protector of Buddhism and Confucianism, was split over whether or not to apply the expulsion edict to the Dutch as well. Those favouring continuation of Dutch–Japanese trade were keenly aware of the benefits that were to be drawn from European contact provided reasonable safeguards were taken. They argued that the Dutch had rendered valuable services to the Bakufu by asserting discovery of a note to the Pope from a Japanese asking the Pope to send an expedition to his country (an incredible fabrication) and by their recent bombardment of Shimabara. The opponents of the Dutch led by the *Kyoto shoshidai* (official representative of the shogun at the Imperial Court) maintained that all Christians were alike, in spite of minor differences in dogma, and as such were a menace to the safety of the nation. They also played on the fear of the possibility of illegal contacts between the Hollanders and the *Tozama daimyo*.

In August 1640, the Dutch had just completed building a fine new stone warehouse at Hirado. Unfortunately they had inscribed on the gables the date of construction according to the Christian calendar.

When this was discovered by the authorities, it was triumphantly seized upon by the anti-foreign factions as a contravention of the Bakufu's anti-Christian edicts. There followed an order that the Dutch immediately destroy the new buildings and all others bearing dates computed by the Christian calendar. The Japanese who had planned to massacre the Dutch for their expected refusal of this directive were foiled by the penetrating knowledge of Caron who, understanding the danger imminent in non-cooperation, ordered instant compliance with this command thus averting a probable annihilation of the handful of Dutchmen at Hirado.

Disappointed by Dutch acquiescence, the anti-foreign forces had promulgated decrees forbidding the Dutch to observe the Sabbath, commanding them to sell all their imports in the year of their arrival, which meant not being able to withdraw them in case of low prices, and prohibiting them from bearing arms or even slaughtering cattle. When the Dutch protested these restrictions and offered the original charter granted them by Ieyasu as evidence in their favour, the Japanese answered:

His majesty [the Shogun] charges us to inform you that it is of slight importance to the empire of Japan whether foreigners come or do not come to trade; but in consideration of the charter granted them by Ieyasu, he is pleased to allow the Hollanders to continue their operations and to leave them their commercial and other privileges, on the condition that they evacuate Hirado and establish themselves and their vessels in the port of Nagasaki.¹²

Much to their chagrin the Dutch shortly discovered that this was a compromise between the pro- and anti-foreign groups and that they were allowed neither to settle at nor even to enter into Nagasaki itself but were to be enclosed on the mud-flat island of Deshima. Yet the Dutch remained in Japan. As H. Nagaoka stated in his study of this era:

Then the Hollanders alone remained in Japan. It is interesting to see what means they employed to win the favour of the shogunal government. This [favour] was certainly thanks to their anti-Catholic politics and to their obedience to the orders of the shogun. Indeed, they understood very well that under despotic government one must display humility and docility.¹³

Had it not been for the steady and moderate policy of the Dutch East India Company, Dutch residents in Japan would undoubtedly have experienced the fate of the Spaniards and Portuguese. Hollanders in Japan who were representing a nation so dependent on its overseas trade were instructed to pay close attention to the

idiosyncracies of the Japanese and to exercise every discretion to avoid any incidents that might cause friction. Thus, great credit must be given to the hardy Dutchmen who, in spite of the continuing restraints imposed by the Japanese, had the tenacity to cling to their precarious foothold at Deshima. And this minute outpost remained for over two centuries Japan's window on the Western world.

III

The island of Deshima

On 24 July 1641, the Dutch were removed from their original trading post at Hirado to that artificial island of Deshima¹ built for the Portuguese some five years before in the harbour of Nagasaki on the shore of Edo-machi.² During the Tokugawa era Nagasaki was in territory under the direct control of the Bakufu (designated as *chok-katsuchi* or *tenryo*)³ with *bugyo* appointed from Edo responsible for the governance of the city. The first *bugyo* (called *Gouverneur* by the Dutch) of Nagasaki had already been appointed in 1592 by Toyotomi Hideyoshi (1536–95), the second of Japan's three great unifiers.⁴ In 1633, two *bugyo* were appointed, and this became the standard number with the two holding office alternately, one maintaining residence at Edo while the other remained at Nagasaki.⁵ The *bugyo* were appointed from the *hatamoto* (banner knights);⁶ their social status had to be *fuyo no ma seki* (literally: may sit in the lotus room of the shogun's palace)⁷ with a stipend of 1,000 *koku*;⁸ the income for the post was 4,402 *hyo* (bags of rice).⁹ *Bugyo* were principally charged with the conduct of foreign affairs and the administration of justice.

Although *bugyo* also had nominal authority over the internal administration of the city, the real control of local affairs was vested in the *machidoshiyori* (town councillors, called *Stad-Burgemeester* or *Burgemeester* by the Dutch) whose positions were hereditary and whose number varied from four to nine.¹⁰ The latter also controlled the conduct of commerce by working as inspectors in the market places.¹¹ The annual stipend of a Nagasaki *machidoshiyori* was 70 *hyo* and rations for five persons (*goninbuchi*)¹² and the wealth of a *machidoshiyori* was comparable to that of a *hatamoto* with an income of over 5,000 *koku*.

Various domains were assigned the tasks of garrisoning and defending Nagasaki. In 1641, the Bakufu ordered Kuroda Tadayuki (1602–54) of Chikuzen to assume this responsibility, and Kuroda ordered the construction of a fort at Nishitodomari where his warriors stood guard. In 1642, Nabeshima Masashige (1605–86) of Hizen was told to supply troops. Subsequently the two domains of Fukuoka and Saga

were appointed to provide armed forces at Nagasaki in rotation, alternating every year in April. By the end of the shogunate seventeen other fiefs had served in this capacity.¹³

Deshima itself, which from the time of its construction in 1636 was an integral part of Nagasaki, had been constructed in the shape of a fan, the legend being that when the shogun was asked to determine its formation, he had snapped open his fan with a turn of his wrist. The name Deshima itself means 'Fore Island' referring to its position before the town of Nagasaki. Its foundation for 1.5 fathoms was of freestone, the island rising about 0.5 fathom above the high-water mark. Both the east and west sides were 35 *ken*¹⁴ (210 feet) each in length. The north side closest to the town was 96 *ken* (557 feet) long while the south side facing the harbour was 118 *ken* (706 feet). The total area of Deshima was 3,969 *tsubo*¹⁵ (about 15,700 square yards) or about the size of the Dam in Amsterdam.¹⁶

The entire island was surrounded with a high board fence on top of which was a double row of iron spikes. On the west side there was a landing gate which was permitted to be opened only at that time during the year when the Dutch ships were being unloaded and loaded.¹⁷ A few paces off the island in the water were thirteen high posts spaced at proper intervals; at the top of each post were small wooden tablets upon which was written in large characters an order from the government strictly forbidding all boats or vessels to come within these pilings or to approach the island. Deshima was connected to the mainland by a small stone bridge with sentries at either end to make sure that no unauthorized persons entered or left the island.

The rental for this tiny parcel of land was 55 *kamme*¹⁸ of silver per year or 5,500 taels.¹⁹ Buildings included, in addition to the residences and warehouses of the Hollanders, several domiciles for Japanese officials such as the overseers, the interpreters and the guards. The Dutch cultivated a flower garden in one corner and also kept cows, sheep, pigs and chickens on the island. An ordinary Dutch house had four rooms, two upstairs and two down, with a kitchen and latrine attached. All of the buildings had to be furnished by the Hollanders at their own expense. Water for cooking came in bamboo pipes from a river inside Nagasaki and had to be paid for as a separate item. Whenever additional buildings were required, they could be constructed but at Dutch expense. Some that were built included a place for the sale of goods, two 'fireproof' warehouses, a large kitchen, a

house for deputies, appointed by the *bugyo* to direct and regulate trade, and quarters for the interpreters.

The number of Dutchmen who stayed on the island varied from year to year although the total rarely exceeded twenty. The general categories of personnel included the following:²⁰ *opperhoofd* (captain, factor) or *opperkoopman* (chief) – (After 1640, the Bakufu ordered annual rotation so that no one chief would become too friendly with the Japanese. In all there were 162 changes but the same man was often reappointed.); *onderkoopman* (vice-chief) – usually 1 man; *pakhuismeester* (warehouse custodian) – usually 1 man; *schrijver* (secretary) – usually 1 or 2 men; *oppermeester*²¹ (doctor) – 1 or 2 men; *ondermeester* (medical assistant) – 1 or 2 men; *boekhouder* (bookkeeper) – 1 or 2 men; *assistent* (assistant) – any number, including gunners, shipwrights, carpenters and Negro slaves.

For this small group of defenceless and isolated Hollanders, the Japanese developed an overgrown bureaucracy which defies even the twentieth-century imagination. Moreover, for all of these innumerable officials the Dutch were financially responsible. In a most deprecatory mood Murdoch wrote: 'No such paradise for officious loafers ever existed as that in Deshima for the upkeep of which the worthy burghers of Amsterdam and Rotterdam were responsible.'²²

Some of these officials as described by Engelbert Kaempfer (1651–1716), the German physician assigned to Deshima in 1692, were:²³ normally 5 gate guards (*monban*), plus their servants (many more at the time of sale of goods), whose duties are to guard the gate from Deshima to Nagasaki (also harbour guards, spies, and deputies to town officials); 6 night guards (*mawariban*) who watch for thieves, fires or accidents, 1 chief officer (*otona*) (assisted by a deputy, 5 secretaries, 15 coolie superintendents, and 36 treasurers), a chief Japanese official who takes care of the government of Deshima, the supervision of trade, the jurisdiction over all servants and the general control of the Dutch; 24 landlords of Deshima (*Deshima chonin*), who supervise Dutch tenants; about 150 Dutch interpreters (*Oranda tsuji*), who are numerous enough to prevent the Dutch from having to learn Japanese; 17 commissioners for victualling (*kaimono tsukai*) with their families, who provide the island with food, household goods and prostitutes; officers of the kitchen (*daidokoro no mono*) (3 cooks, 2 kitchen grooms, apprentice cooks and labourers), who undertake kitchen chores; and a small number of personal servants and small boys acting as messengers.

This extensive retinue of officials, many of whom were nothing more than hangers-on and all of whom were listed on the Dutch expense account, gives a good indication of the difficult existence to which the Hollanders were relegated after their removal to Deshima. Not only were the officials, agents and guards an onerous burden, but the stringent regulations that accompanied their presence were even more odious. The guards at the gate prevented all communication with the city of Nagasaki, and no one could enter or leave the island without official authorization which was given only on rare occasions. No Japanese could live in a Dutchman's house with the exception of 'public' women. All property, personal or communal, was subject to search and seizure at any time. No Dutch citizens were to be buried in Japanese soil. Dutch ships had their guns, ammunition and rudders removed and their sails sealed on entrance into Nagasaki harbour while the ships were 'inspected' (ransacked) by representatives of the *bugyo*. Dutch vessels leaving Japan were under orders to set sail on the twentieth day of the ninth month regardless of weather. Religious services on Deshima or aboard ship were strictly forbidden, and caution was taken that no religious literature would reach Japanese shores. While the Dutch ships were at Deshima for their yearly trading, all Hollanders were under rigid surveillance, and none was permitted even to visit one ship from another. In addition to the annual visits to the shogun on the first day of the eighth month of each year, at the beginning of a new year and on other ceremonial occasions, the Dutch were required to present gifts to Nagasaki officialdom. Of great importance to the Japanese, too, was the admonition that, 'Whatever comes to your knowledge in whatever country you trade to, we expect you should notify to our governor of Nagasaki.'²⁴ This advice was regularly repeated to the Dutch on their visits to Edo.

Thus under such close surveillance and severe restriction it is not surprising that Karl Pieter Thunberg (1743–1828), the Swedish botanist and physician sent to Deshima in 1776 by the Dutch East India Company, found conditions there very little changed since the time of Kaempfer some eighty-five years before. Thunberg's dreary description of life and isolation in that artificial 'prison' is well stated in the following passage from his book:

A European condemned to spend the rest of his life in this solitude would truly be buried alive. News of great upheavals of empires never reaches this place. The journals of Japan and still less those of foreign countries do not arrive

here. One can vegetate here in the most absolute moral nullity, foreign to all that is taking place on the world scene.²⁵

The *Nagasaki-e* or those Japanese prints which dealt with the subject matter of foreigners in Nagasaki provide an insight into the Japanese view of the Dutch on Deshima as slothful and self-indulgent:

Content to waste his days and nights, [the Hollander] lolls in a large chair, smoking a long pipe and looking very bored. A table loaded with food is before him, a decanter and glasses at one arm and a fawning geisha at the other. The ever-watchful Nagasaki interpreters are kneeling on the far side of the room, and scurrying Japanese servants are in the background.²⁶

One of the 'Regulations concerning the Street Deshima' which was posted on the bridge from Nagasaki read: 'Whores only, but no other women shall be suffer'd to go in.'²⁷ Since women from Holland were forbidden entrance to Deshima, at least in this respect the Japanese recognized a rather basic need on the part of the lonely Dutch. Both Kaempfer and Thunberg give similar accounts of the relationships. These Japanese women were procured by one of the commissioners of victualling. They came over from Nagasaki accompanied by a serving-maid who was a young apprentice of the tea house from which the girl was sent and who brought her mistress's food from town, made her tea and kept her things in order. A female companion could be had for not less than three days and might be kept a year or even several years. In addition to her regular fee the Dutch were expected to provide for her maintenance and to give her frequent presents of silk dresses, girdles, headdresses, etc. G. F. Meijlan, who was *opperhoofd* from 20 December 1825 to 1 January 1831, made a very original explanation for this custom of the Dutch. Since none of the male Japanese servants was allowed to remain in Deshima overnight, Meijlan rationalized: 'How then could the Dutch residents otherwise manage to procure any domestic comfort in the long nights of winter, their tea water, for instance, were it not for these women.'²⁸ Meijlan also highly praised their strict fidelity and affection and appeared to regard such liaisons as temporary marriages.

By the eighteenth century the Hollanders were permitted to leave Deshima to visit Nagasaki's red-light district at Maruyama. Even so, the prices were so exorbitant, as much as 65 *momme*²⁹ of silver compared with only 5 *momme* for the Chinese traders, that the use of this privilege was limited, e.g. in 1722, some 20,738 Chinese visited

the brothels while the Dutch visitors numbered only 270.³⁰ This disparity may, of course, also be accounted for by the fact that there were so many more Chinese than Dutchmen at Nagasaki.

Most accounts do not explain the fate of the children born to these companionships. However, such children, though born of Dutch fathers, were considered to be Japanese. Their mothers were permitted to nurse them in the houses of their fathers, but at an early age they were subject to restrictions similar to those imposed on other Japanese in intercourse with foreigners. The only indulgence allowed the Dutch fathers was permission to receive occasional visits from their children at certain specified periods and to provide for their education and support. Frequently the fathers were also required to purchase for their adult Japanese sons some office under the government at Nagasaki or elsewhere.

Deshima was not a pleasant place, and the treatment of the Dutch after their removal there in 1641 was harsh. Several reasons, however, are discernible for the actions of the Japanese. First of all, the Dutch were subject to two characteristic institutions of the Tokugawa Period in Japanese history: the *metsuke* system and the annoying meddlesomeness of an increasingly numerous bureaucracy. As described in the introduction, the *metsuke* was a nationwide intelligence organization which reported to the central government on all activities in the outlying areas. Naturally the Hollanders came under the watchful eye of the *metsuke* network. In addition, the Dutch were perhaps easy prey for the numerous petty officials who tried to outdo each other in demonstrations of authority in order to win the approval of the Bakufu.

Strict regulation and supervision of the Dutch on Deshima had other bases. The Japanese had an overwhelming fear of the possible reintroduction of Christianity as was proved by the continuation of inquisitional methods among their own citizens down to the end of the seventeenth century. They also feared smuggling attempts by the Hollanders although extensive evidence indicates that smuggling continued through the Tokugawa Period.³¹ Perhaps they even considered the likelihood of these few helpless Dutch rising up in an armed attack, possibly with some new deadly weapon unknown in Japan.

There was also among the Japanese a deep hatred for the Dutch traffic in slavery and the cruelty with which their East Indian and African slaves were sometimes treated. They disapproved too of the

manner in which Dutch officers abused their subordinates. Possibly most important of all was the disdain with which the Japan of the early Tokugawa period regarded all commercial activity. In a society like that of Japan, built on a hierarchy of feudal rulers, warriors and bureaucrats, trading was still looked upon with a jaundiced eye. To the Japanese, then, the Dutch represented by their very presence the commercialism which was seen as threatening to the spiritual foundation of the Japanese nation.

In analysing the co-operative spirit with which the Dutch accepted these many restrictions, it must be denied that they ever were or are by nature a subservient people. Their belief in the necessity for continuation of their Japanese trade monopoly in order to help to maintain their domestic economy is obvious. Great profits had been reaped in the years from 1638 to 1641, and there was every reason to hope that these would continue despite restrictions. The Dutch understood, however, that their presence in Japan was not indispensable and that many of the petty Bakufu officials who swarmed about them were looking for opportunities to report infringements of regulations, hoping thereby to enhance their own prestige. Consequently, the Hollanders remained calm in the face of great adversity and carefully obeyed the provisions of the many Japanese ordinances.

IV

Visits to Edo

It was the custom in Japan that all daimyo should make annual pilgrimages to the capital to pay their respects and make presentations to the shogun. In the original charter granted to the Dutch by Ieyasu, he had also given them the privilege of paying homage directly to the shogun.¹ For this purpose the Dutch *opperhoofd* was granted the status of a daimyo since with the exception of some high Bakufu officials only daimyo were admitted into the presence of the shogun.² Actually these visits to the capital, known in Dutch as *De Hofreis naar Edo* and in Japanese as *Edo Sanpu* or *Sanrei*, were the only real opportunities afforded the Dutch for knowing anything about Japan outside the vicinity of Nagasaki. In a like manner such journeys were also the major means by which the Japanese public knew of the existence of the Dutch and accordingly of the Western world.

In the early years of the confinement at Deshima the Dutch attempted to make use of these journeys to Edo to try to improve their lot. This was especially true of the mission of one Dr Pieter Blockhuys (Petrus Blokhovius), head of a Latin school in Holland, who was sent to Japan as a special envoy in 1649 to announce in as conciliatory a way as possible the conclusion of a truce between the Dutch and the Portuguese which had taken place in 1645. En route to Japan, Dr Blockhuys became very ill. On his arrival at Batavia the authorities, realizing the psychological value of an envoy dispatched from Europe, decided that he must continue his mission. Fearing Blockhuys might die before reaching Japan, the Batavia authorities secretly gave instructions to Blockhuys's secretary, Andries Frisius, to assume command of the expedition in case of Blockhuys's death and to carry the corpse ashore at Nagasaki as proof that a special envoy had been sent. These precautions were not in vain as Blockhuys did die, his funeral was held at Deshima and Frisius prepared to continue the mission.³

Frisius's diplomatic instructions were very carefully drawn up. He was to conceal the fact of Holland's status as a republic since republics were not understood by the Japanese rulers, and even his instructions

were signed by a fictitious 'King of the Netherlands.' Frisius was to memorize the answers to all questions that were anticipated so that when questions were asked a second time his answers might be identical. The treaty between Holland and Portugal, for example, was to be explained as part of an overall plan to unite Europe against the evil Turks. Frisius's mission was also told to thank the Japanese seven times for every kindness, particularly the saving of the lives of the shipwrecked crew of the *Breskens*, which had come ashore in Japan in 1643, and, above all, 'to take special heed that no one indulges in strong drink or lechery. Punish all such evil doers severely. See to it that the members of your suite keep their nails trimmed short, their hair well combed, and they wear clean clothes, and that they wash often.'⁴ In spite of these detailed precautions and after staying at Edo from 31 December 1649 to 16 April 1650, Frisius's entreaties for betterment of relations between the two states were rejected.

A further effort was made by the Dutch when Zacharius Wagenaer (*opperhoofd* at Deshima from 2 November 1656 to 26 October 1657 and from 23 October 1658 to 3 November 1659) was sent on two trips to the Bakufu capital in 1657 and 1659. Wagenaer also failed to bring about any improvement in the situation of the Dutch. Unfortunately the year 1657 was a particularly calamitous one in Japanese history. Tenant farmers and religious zealots were rioting in the provinces. One of many periodic conflagrations wiped out two-thirds of Edo. Women and children were being slaughtered in religious pogroms brought on through fear of a revival of Christianity. For most of these disasters foreigners were blamed both for the sake of convenience and also because many Japanese honestly believed that the violation of Japan by aliens and their despised ideas was seriously antagonizing the *kami* (deities).⁵ In view of these unhappy coincidences the effort to regain the status the Hollanders had had prior to 1641 was a failure, and under such conditions the Dutch were probably lucky to have retained their limited commercial rights. At any rate, no further diplomatic attempts to improve the status of the Dutch at Deshima were made until the middle of the nineteenth century.

Dutch representation on the regularly prescribed trip to Edo usually consisted of the *opperhoofd* or a special plenipotentiary, a secretary, the company physician and such other personnel (commercial attachés, accountants, assistants, etc.) as might be deemed appropriate in a given year. One of these physicians, the aforementioned Dr Engelbert Kaempfer, provides perhaps the most vivid

descriptions of the trip itself and of the audience with the shogun to have been written.

In preparation for the journey the selection of appropriate presents for the shogun and his advisers and the 'great offices' at Edo, Kyoto and Osaka was of prime importance. The Nagasaki *bugyo* acted as judges to determine what particular gifts would be acceptable to the Bakufu, and from Kaempfer's account one must consider them stern in the extreme. Certain curiosities of nature or art which were brought to Deshima expressly for the shogunal presentation were turned down by the *bugyo* as unacceptable. These included two brass fire engines 'of the newest invention' and a cassowary bird whose greatest fault was too ravenous an appetite.⁶

The preparation for the journey was so complete as to be reminiscent of an expedition to some remote part of the world. Officers and interpreters were appointed from the retinue of the Nagasaki government. *Metsuke* were also attached to the group. Horses and porters were hired, and the baggage train was packed with all the personal necessities which the Hollanders might require en route, including tables, chairs, wines, cheeses and other Western foodstuffs.⁷

The round trip normally consumed about ninety days and from 1661 on the Dutch were supposed to leave Nagasaki at New Year and arrive in Edo about 1 March (the first ten days of April by the solar calendar). The journey proceeded overland from Nagasaki across Kyushu to the straits separating Kyushu from Honshu and by boat across to Shimonoseki.⁸ From Shimonoseki to Hyogo the Dutch travelled by water and then proceeded via the Tokaido, passing through Osaka and Kyoto to Edo. Particularly on the island of Kyushu the Dutch *opperhoofd* received honours equivalent to those given any travelling daimyo. Stops were made each night at the finest inns or at the houses of local officials, and the Hollanders were assigned to the best-available quarters. Salutations of deep reverence greeted the approach of the chief of the mission as he passed by in the palanquin in which he was privileged to travel. As a rule, however, the Deshima policy of supervised confinement was adhered to during the trip, and the Dutch were not permitted to sightsee or to leave their various way stations at will.

At Edo, where the Dutch generally spent two to three weeks, they were lodged in the *Nagasakiya* in Nihonbashi Honkokucho and were not permitted to move freely about the city. The *Nagasakiya* was a house set aside by the Bakufu for the use of official visitors from

Nagasaki. It was at the *Nagasakiya* that the Dutch received a continuous stream of Japanese visitors, in particular physicians and astronomers. In theory, at least, all callers at the *Nagasakiya* were required to have official permission from the Bakufu; however, the Dutch often complained of the numbers of curiosity-seekers who seemed to come in and out at all hours of the day and night. Nevertheless, there was universal admiration for the seriousness, the quest for knowledge and the level of prior achievement evident among the Japanese physicians and astronomers who came to the *Nagasakiya*. Unfortunately and not unexpectedly the *opperhoofd* and the medical doctor who happened to be in Edo as Dutch representatives in many instances were unable to reply to the increasingly sophisticated questions which the Japanese posed. Moreover, the level of interpreting, although generally adequate for commercial activities or for ordinary conversation, often did not measure up to the needs of even rudimentary scientific inquiry.

On the appointed day of the presentation to the shogun, presents were sent by the party to be offered for inspection. After a stately procession through the city's streets and into the inner palace ground, the Dutch awaited the actual moment of audience in a room off the main reception hall. At last only the *opperhoofd* himself was taken into the majestic presence where, at the cry 'Oranda Kapitan', he crawled on all fours to a point between the displayed presents and the shogun's dais, bowed his head to the ground once, and without uttering a sound crawled backwards out of the presence of the shogun who sat hidden by a lattice curtain and remained invisible to the *opperhoofd*. So ended the entire official audience.⁹

However, a few hours later a second reception was given the Dutch in the shogun's apartment. This time all the leading Bakufu figures and some of the lesser lights were given a chance to observe the foreigners close up while the shogun and his party viewed the proceedings from behind lattices made of split reeds and covered with fine silk with openings in them big enough to see through. Kaempfer describes the proceedings of his 1691 visit as follows:

We were asked a thousand ridiculous and impertinent questions. They desired to know how old each of us was, and what was his name, which we were commanded to write upon a bit of paper, in anticipation of which we had provided ourselves with an European inkhorn. This paper, together with the inkhorn itself, we were commanded to give to Bingo¹⁰ who delivered them both into the emperor's [sic] hands, reaching them over below the lattice. The

captain, or ambassador, who asked the distance of Holland from Batavia, and of Batavia from Nagasaki, also which of the two was the most powerful, the Director-General of the Dutch East India Company at Batavia or the Prince of Holland? As for my own particular, the following questions were put to me. What external and internal distempers I thought the most dangerous and most difficult to cure? How I proceeded in the cure of cancerous tumors and imposthumations of the inner parts? Whether our European physicians did not search after some medicine to render people immortal, as the Chinese physicians had done for many hundred years?¹¹

Again on his second visit to Edo the following year, Kaempfer and his compatriots were subjected to similar interrogation, and he writes:

Soon after we came in, and had, after our usual observances, seated ourselves in the emperor's [sic] name, he then desired us to sit upright, to take off our cloaks, to tell him our names and age, to stand up, to walk, to turn about, to sing songs, to compliment one another, to be angry, to discourse in a familiar way like father and son, to show how two friends or man and wife compliment or take leave of one another, to play with children, to carry them about in our arms, and to do many more things of a like nature. . . . Then they made us kiss one another like man and wife, which the ladies particularly showed by their laughter to be well pleased with.¹²

This sort of tomfoolery did not continue after the end of the eighteenth century, and the Dutch journeys to Edo for their annual audience became more formalized affairs. After 1790, such visits paid upon the capital became quadrennial due to Japanese consideration for the financial burden entailed for the Hollanders whose trade had fallen off so greatly by then.¹³ However, gifts were still transmitted to the court annually although at a much reduced cost.

To date these pilgrimages to the city of Edo by the Dutch have been treated by most authors as indicative of the continuous humiliation that the Japanese heaped upon a subservient people. This seems to be, however, a mere surface interpretation of the facts. In the eyes of the Japanese, as in actuality, the Dutch at Deshima were a group of traders representing the Dutch East India Company, and as such they were really not entitled to any particular recognition. Nevertheless, in view of the original stipulations of the charter from Ieyasu and also because the Dutch East India Company was a government-sponsored corporation, the Hollanders were given the signal honour of making the journey to Edo in some style, presenting gifts to the shogun and paying their respects to him in person. All of these were privileges reserved for the highest-ranking personages and would never have been accorded to native merchants. Even Kaempfer is forced to admit

that no better reception was given the greatest daimyo in Japan than was given the Dutch.¹⁴ It is also true that the audiences continually improved in tenor over the years as a result of excellent Dutch presents and increasing familiarity between the representatives at Edo and thus provided an important tie both politically and culturally with the foreigners.

Some parallel might also be drawn with the ancient Chinese concept of tribute. This tributary system was an application to foreign relations of the Confucian ideology by which Chinese emperors gained an ethical sanction of their exercise of political hegemony. The virtuous ruler by his proper moral conduct attracted the rude barbarians into his sphere of influence. Accordingly, he had the right, it was believed, to expect humble submission from the foreigner who had sought him out. Naturally it was assumed that when the Europeans appeared on the Chinese scene they were begging admittance to the benefits of a higher civilization. A tributary ruler of a foreign state should receive an imperial patent; a noble rank was conferred upon him; a tribute mission was sent to the capital where it was lodged, protected and entertained; gifts were exchanged; the mission was received at an imperial audience where the kowtow was performed. Indeed the presentation of tribute in imperial China was a boon and a privilege as well as an indication of good manners, and not an ignominious ordeal.

As far as the actual trip to Edo was concerned, the local daimyo gave the Dutch very cordial welcomes along the road. This was done in spite of the fact that their retinue of 250 or so persons represented a meagre financial outlay when compared with the numbers that usually accompanied the ordinary feudal lords on similar excursions. Another fact that is rarely mentioned is that the custom of giving presents to the shogun was not by any means a one-way procedure. For example, Kaempfer reported, when he was at the capital on 25 April 1692, that the Hollanders received 30 'gowns' from the shogun, 10 from each of the 5 *roju*, 6 from each of the 4 *wakadoshiyori*, 5 from each of the *jishabugyo* and 2 more from each of two Edo *machibugyo*.¹⁵ By the 1830s still more lavish presents were given to the Dutch. J. F. van Overmeer Fischer, author of *Bijdrage tot de kennis van het Japansche rijk* (Amsterdam, 1833), lists 'twelve beautiful birds, fifty rare plants, a pair of dwarf fowls, a pair of rabbits, a pair of fan-ducks, and some pieces of silk; all contained in such elegant cages and boxes, that their cost no doubt exceeded that of their contents.'¹⁶

It must also be noted that much of what the detractors of the Dutch

termed 'humiliation' was a result of the intricacies of East Asian etiquette and formalism which were replete with a ceremony and politeness incomprehensible to the European. Other foreigners may not have been willing to accept the status of the Hollanders in Japan; but, if this is true, then it must forever be to the credit of the Dutch that they maintained their long-time exclusive position through a willingness to co-operate with the Bakufu and to accede to local customs.

V

The Nagasaki interpreters and early medical and astronomical studies

Having summarized the general position of the Dutch in Japan during the Tokugawa Period, it is necessary to describe that group of Japanese who during the long years of the confinement of the Hollanders at Deshima had the most intimate contact with the foreigners. The hereditary Japanese interpreters of the Dutch language at Nagasaki not only had the responsibility for day-to-day dealings with the Europeans but also through their knowledge of Dutch provided a springboard for the development of *Rangaku*.

The interpreters combined the jobs of linguist, commercial agent and spy. Though their positions dated from the Dutch factory at Hirado, their systematic ranks seem to have emerged in the Nagasaki–Deshima era.¹ In charge of all the Dutch interpreters was the *tsujinakama no kashira* (head of the interpreter corps). In 1656 the *kotsuji* (minor interpreter) classification was established, and those previously appointed were advanced to *otsuji* (major interpreter). Towards the end of the seventeenth century the posts of *kotsujinami* (minor interpreter, middle grade) and *kotsujimasseki* (minor interpreter, lowest grade) were established.² In 1695, a *Totsujimetsuke* (overseer of Chinese interpreters) was appointed, and a similar *metsuke* with an income of 7 *kamme* and rations for five men was placed among the Dutch interpreters.³ Under him in descending order were the following:⁴

<i>Rank</i>	<i>No.</i>	<i>Income</i>
<i>Otsuji</i> (<i>oppertolken</i>) (senior interpreter)	7	11 <i>kamme</i> , rations for five persons
<i>Kotsuji</i> (<i>ondertolken</i>) (junior interpreter)	10	7 <i>kan</i> , 300 <i>me</i> , rations for three persons
<i>Kotsujisuke</i> (<i>temporaire ondertolken</i>) (assistant junior interpreter)		
<i>Kotsujinami</i> (<i>vice ondertolken</i>) (junior interpreter, middle grade)	6	3 <i>kan</i> , 500 <i>me</i> , or 3 <i>kamme</i>

Rank	No.	Income
<i>Kotsujimasseki</i> (<i>provisioneele ondertolken</i>) (junior interpreter, lowest grade)	16	3 <i>kamme</i> or 3 <i>kan</i> , 170 <i>me</i> or no remuneration
<i>Keikotsuji</i> (<i>leerlingen</i>) (apprentice interpreter)	19	3 <i>kamme</i> or 2 <i>kan</i> , 170 <i>me</i> or no remuneration
<i>Naisuji</i> (<i>particuliere tolken</i>) (interpreters who took a commission for interpreting during the annual sale of Dutch goods)		2 <i>kamme</i> or 170 <i>me</i> or no remuneration

Despite the established number for each classification, the numbers apparently varied since Itazawa Takeo states that by the end of the shogunate there were 140 interpreters overall.⁵ Kaempfer reported that there were 8 so-called *hontsuji* (chief interpreters), 4 *otsuji* and 4 *kotsuji*, and he placed the number of *keikotsuji* at never less than 8 and the number of *naisuji* at over 100.⁶

One *otsuji* and one *kotsuji* were given annually in rotation the title *nemban* (on duty for the year) and had special duties such as taking charge of the comings and goings of high officials. Both *nemban* accompanied the Dutch on their journey to Edo while the *otsuji nemban* was the official most directly in contact with them concerning all ordinary matters.⁷

The interpreters at Hirado were not originally government employees but had been employed individually by the Hollanders much like domestic servants. When the factory was transferred to Deshima, eleven men were officially made interpreters to assist in the moving. Eight interpreter families came with the Dutch from Hirado: Hideshima, Inomata, Ishibashi, Kimotsuke (later Yoshio), Namura, Sadakata, Takasago and Yokoyama. The Nishi family made the transition from Portuguese interpreter to Dutch interpreter, and the Baba family changed from Chinese interpreting to Dutch interpreting. In 1643 the Shizuki family at Nagasaki received its first appointment as a result of interpreting done during the interrogation of the crew of the shipwrecked *Breskens*. Subsequently additional hereditary interpreter families at Deshima included Hori, Imamura, Kafuku, Motoki, Narabayashi and Shigei.⁸ This group formed the nucleus of a

hereditary system of interpreter families who made the interpreting profession a tightly closed corporation. There was a great deal of intermarriage among the interpreter families, and most of them were related to one another. Also, the interpreters formed a kind of guild with shares of stock (*kabu*) held by the hereditary families and passed on from father to son.

The latter half of the seventeenth century might well be termed the boom period for the interpreters. Indeed the memories of the so-called 'Christian' rebellion of Shimabara, of the expulsion of the Portuguese and of the confinement of the Dutch at Deshima were still fresh in the minds of the Japanese. Thus it was natural that there was a general lack of enthusiasm for Western learning on the part of the scholars of the early Tokugawa Period, and knowledge of the Dutch language in that era seems to have been limited almost entirely to the interpreter corps at Nagasaki.⁹ At first the comprehension of Dutch was only learned by word of mouth and by memory aids taken down in a crude katakana. On 15 December 1670 the *Dagregister* (Deshima Daily Record, kept by the Dutch) noted that the interpreters were practising writing Dutch. Even earlier the *Dagregister* contains notations that what were thought to be Dutch books were in the hands of the interpreters.¹⁰ The first attempt at formal training seems to have begun in 1671, when the Deshima *Dagregister* notes that by order of the Nagasaki *bugyo* a number of youths from the ages of 10 to 12 were sent to Deshima every day to practise reading and writing Dutch.¹¹ Again in an entry for 9 November 1673, it is remarked that children of 12 and 13, the sons of interpreters, come daily to Deshima to practise Dutch and that on set days members of the factory give lessons.¹²

A great deal of confusion is present in studies of this period in regard to the questions of whether or not there was a ban by the Bakufu on the importation of Dutch books and whether or not the interpreters could read the Dutch language. The much debated order which is supposed to have kept Dutch books out of Japan was the Edict of Kan'ei¹³ issued by Shogun Iemitsu in 1630. This ordinance prohibited the importing of all Western books dealing with Christianity including those written in or translated into Chinese which encompassed immediately thirty-two works by Matteo Ricci (1552–1610), the famed Jesuit missionary to China, and other Europeans.¹⁴ Also forbidden were any books which the Japanese believed aimed at the propagation of Christianity such as works on Catholicism, bibles

and even some books on the calendrical system.¹⁵ However, under the edict those writings that only described or mentioned the manners and customs of Christendom were permitted entry.¹⁶

The purpose of the shogun's order was to wipe out the new religion but not necessarily to exclude the culture of the West. However, because of the fear and hatred of the missionaries felt by the officials and also because of the latter's belief that the teaching of science was often made a cloak for Christian proselytizing, the government made little distinction between the purely religious and the non-religious works. For example, in 1685, Mukai Gensei (1653–1727), son of Mukai Gensho (1609–77) (see below p.91), was made chief inspector of books and banned all books that made mention of such terms as 'Catholic', 'Jesus', 'Western', 'Europe', 'Ricci' and 'Nestorian Christianity'. Gensei also prohibited any work which might have a passage describing the Western hemisphere or a map showing any of the Christian countries. Even Chinese local histories which mentioned Christian monuments, missions or missionaries were destroyed.¹⁷ However, it seems clear according to the text of the pronouncement of 1630 that it had to do with books written by Westerners in Chinese or translated into Chinese and did not mention books originally written in Dutch. The Bakufu, in fact, never had an overall ban on the importation of Western books.

From the time of Oda Nobunaga until the Edict of 1630 both the prosperity of overseas trade and the activity of Christian missionaries caused a gradual increase in the number of Japanese who read Western writings in the original. But the number so endowed was infinitesimal when compared with the number who read Chinese books.¹⁸ And since there was practically no importation of Western books other than by the missionaries, Western books in their original languages had been of little concern to the authorities. After the ban on Christianity, the expulsion of the missionaries and the pronouncement of the *sakoku* policy, the general public lost most of its opportunities to have any contact with Western works. Moreover, the citizenry, fearing to incur suspicion, tried to avoid any knowledge of Western writing. Since all this took place after 1630, it is not surprising that the Kan'ei ban is generally interpreted as a prohibition of the importation of Western books.

However, the interpreters at Nagasaki not only saw Dutch books but were painstakingly learning to read them. According to Itazawa: 'There is no doubt that Western books not pertaining to Christianity

were permitted to be brought in for the use of the Dutch settlement or for presents to the Bakufu.¹⁹ In 1650, the Bakufu ordered a book on dissection;²⁰ in 1659, Zacharias Wagenaer presented to the Bakufu a copy of a now classic sixteenth-century study of botany²¹ by Rembert Dodoens (Rembertus Dodonaeus) (1518–85), physician, linguist, writer, mathematician and professor of medicine at Leiden University; in 1663, Hendrick Indijck, *opperhoofd* from 6 November 1662 to 20 October 1663, took to Edo as a gift a copy of the 1660 Dutch edition, translated from Latin, of an animal sketch book²² by the Polish naturalist of Scottish descent, John Johnston (1603–75), with illustrations by Matthieu Merian (1593–1650).

It is extremely probable that the weakness of the interpreters in Dutch language study, due primarily to the lack of essential materials (grammars, dictionaries, etc.), led to the spread of the legend that they could not read Dutch. Various entries in the *Dagregister* point up these shortcomings: 1672 – since the interpreters had difficulty reading the documents presented to the *bugyo* by the factory, the Dutch had to read and translate them;²³ 1693 – the names of each of the apprentice interpreters are listed, and their abilities are criticized as follows: Nishi Sukejiro, the son of the late Nishi Kichibei Gempo (1653–84), ‘studied Portuguese but whether it was because he was not diligent or because he was stupid, despite long years of practice, he could not understand a thing’; another ‘can’t understand a word of Dutch, but he is trying’; another ‘can’t understand much Dutch, but makes a fine outward appearance’; another ‘can hardly understand Dutch’; ‘so-and-so can’t hold a candle to his grandfather’; etc.²⁴ That the interpreters could not read Dutch has also been given wide credence because of the statements of two of the most prominent and respected pioneers of the *Rangaku* movement. Sugita Gempaku (1733–1817) in *Rangaku kotohajime* (Facts about the beginnings of Dutch Studies) (1815) and Otsuki Gentaku (1757–1827) in *Rangaku kaitei* (Introduction to Dutch Studies) (1788) both²⁵ wrote that under the rule of the eighth shogun Yoshimune (1684–1751) for the first time the interpreters were allowed to read Dutch books.²⁶

Yet from notations in the *Tsuko Ichiran* for 1671 and 1715 it can be clearly seen that the interpreters were not forbidden to read Dutch books.²⁷ Moreover, in the preface to a written pledge of a Dutch interpreter in 1671, there is an article which reads: ‘Written materials in Dutch or Portuguese must be translated as they are without any alterations.’²⁸ Again in 1714, in an instruction book for Dutch

interpreters the Bakufu can clearly be seen to encourage the study of foreign books.²⁹ The error of Sugita and Otsuki stems no doubt from the lack of scholarly material produced by the interpreters in those earliest years. Though contact with the Dutch seems to have been limited almost completely to the conduct of a minimum of daily business and although the interpreters had no grammars, no dictionaries and no competent instructors, examples of the results of the relationship between the interpreters and the Hollanders can be cited. Since the emphasis of the Dutch interpreters was necessarily on language study as noted above, they had no particular intention to carry on systematic scholarship, and although the remains of their early work are rather fragmentary, one can see interesting developments in such fields as medicine and astronomy, the same two fields which were to become the very core of *Rangaku*.

In the 'Christian Century' an impressive effect of contact with the West emerged in medical science. Since the arrival of the missionaries coincided with a period of violent civil wars preceding the establishment of the Tokugawa regime, it is not surprising that Western medical techniques were quickly put to use in the natural desire to save lives. Then, following the expulsion of the Portuguese, Dutch-style medicine began to take root among the interpreters from the middle of the seventeenth century. How this developed can be seen from the following:

Besides interpreting the interpreters were supposed to completely superintend the Dutch. . . . When the Dutch fell ill, their treatments and surgical operations could not escape the surveillance of the interpreters. And as a saint's maid quotes Latin, the Dutch interpreters could imitate the physicians. Since they had to be asked into the homes of the ill merely with the intention of keeping things within limits, they viewed with awe the surgery and the medical prescriptions. But these unsanctioned masters had unexpectedly good results. And for the patients it was a pleasure, and they were much talked about by the public, and people came begging earnestly for instruction. Since it was also one way to make money, it was judged far from easy to discard.³⁰

Moreover, the interpreters were in demand as intermediaries for the Dutch physician on the regular *hofreis* both en route to and at Edo where the Hollanders' medical knowledge (real or attributed) was in great demand. In such instances as well as in those where patients themselves sought actual treatment for one or another illness, interpreting was essential of course, and it is not surprising, therefore, that

increasingly some of the interpreters themselves became rudimentary practitioners of Western-style medicine. In addition, direct interpreter study of Western medicine under the resident Dutch physician began soon after the move to Deshima resulting in the introduction into Japan of various innovative medical techniques.

The first Dutch-style group of interpreter-physicians was called the *Kasuparuryu* (Casper-style) and included all of those interpreters who studied either at Nagasaki or at Edo under Casper Schambergen, resident in Japan from 1649 to 1651. A few weeks before Schambergen was selected to make the journey to Edo, four young Japanese came to Deshima specifically to study his medical techniques. Again at Edo his popularity was so great that he was asked to remain behind and give lessons in European medicine. When he finally started back to Nagasaki on 14 November 1650, the shogun evidenced his tremendous gratitude by showering Schambergen with costly gifts.³¹ Perhaps his outstanding pupil was the interpreter Inomata Dembei (d. 1666) who had been one of the original interpreters selected at the time of the transfer of the Dutch to Deshima from Hirado. Inomata's Casper-style medicine was later continued by Kawaguchi Ryoan (1670–1746) and Irako Dogyu (1671–1734).

The aforementioned interpreter Nishi Kichibei Gempo was a pupil of the Portuguese apostate priest Christovao Ferreira who took the Japanese name Sawano Chuan (1580–1652). Gempo was one of the *Nambanryu* (Portuguese-style) physicians who later studied Dutch-style medicine. In 1668, he was given a certificate of proficiency jointly signed by Constantin Ranst de Jonge (*opperhoofd* from 6 November 1667 to 25 October 1668) and the physicians Arnold Dirckz and Daniel van Vliet. After 1673, Gempo was at Edo where he combined the duties of Dutch interpreter with that of Bakufu physician. He was given the title *Oranda sankin tsuji metsuke* (supervisor for interpreters at the Dutch attendance) and was granted a residence at Nishiokubo where he began a school of medical practitioners known by the name *Nishiryu* (Nishi-style).³² Gempo was also the author of *Shokokudosansho* (The products of various countries).

Narabayashi Chinzan (Shingobei) (1648–1711), founder of the *Narabayashiryu* (Narabayashi-style) of medical practice, as a member of a hereditary Nagasaki interpreter family, had studied written and spoken Dutch from childhood. As a result of his intensive study under various physicians from Holland, especially Willem Hoffman stationed in Japan from 1671 to 1675, Chinzan reached the rank of

kotsuji in 1666 and twenty years later became an *otsuji*.³³ Then in 1691 he was appointed an official physician to the Bakufu.³⁴ In 1706 he wrote two treatises circulated in manuscript which achieved canonical significance for those who followed his school of surgical methods. These were *Koi geka soden* (Barbarian surgery handed down) and *Geka gijutsu no sho* (Book of surgical techniques). *Koi geka soden* was based on a 1649 Dutch translation, which Chinzan obtained in 1688, of a book on surgery written by the 'Father of French Surgery' Ambroise Paré (1517–90).³⁵ Some of the learned mentors of Chinzan included Willem ten Rhijne, Andries Cleijer and Engelbert Kaempfer.

Ten Rhijne (1647–1700) was born in Deventer and had his first scientific education at the 'Illustre School' which had been founded in Deventer in 1630. In 1668 he studied at Leiden under the anatomist Johannes Hornius (1621–70) and the physician and botanist Florentius Schijl (1619–69) and later also studied at the Sorbonne. In 1673 Ten Rhijne went into the service of the Dutch East India Company as a physician, leaving in June for Asia, supposedly specifically to be sent to Deshima because of the request by the Japanese that a leading doctor of medicine be sent from Holland to Japan. In fact, Ten Rhijne was the first university graduate to be appointed a physician in residence at Deshima.

Ten Rhijne left from Batavia together with the new *opperhoofd* Martinus Caesar (at Deshima 2 November 1670–21 October 1671; 13 November 1672–29 October 1673; 20 October 1674–7 November 1675). During his two years in Japan, Ten Rhijne made the trips to Edo in 1675 with Caesar and in 1676 with Joan Camphuys (at Deshima 22 October 1671–12 November 1672; 29 October 1673–19 October 1674; 7 November 1675–27 October 1676). Ten Rhijne took an interest in traditional Japanese medicine and through his writing introduced Japanese acupuncture and moxibustion to Europe. Also, while in Japan, Ten Rhijne sent the Danzig botanist Jacobus Breynius (1637–97) an essay on the tea plant and the branches and fruit of the Japanese camphor tree. Reference to the latter plant appeared in Breynius's *Exoticarum plantarum centuria prima* (Danzig, 1678).

Andries Cleijer, *opperhoofd* at Deshima (20 October 1682–8 November 1683 and 17 October 1685–5 November 1686), was born in Cassel. He studied medicine, achieving the degree of Licentiatius or Doctorandus and as a soldier went to the Indies where in 1667 he was

named chief of the medicinal stores. In 1682, Cleijer published *Specimen medicinae sinicae*, a work based on the research done by the Polish Jesuit Michel Boym (1612–59) who was in China from 1643 to 1659. While in Japan Cleijer made a collection of drawings of plants which he had assembled and which he sent to Berlin where they were published as the first *Flora japonica*.

As a result of the scholarly stature of such Europeans as Ten Rhijne, Cleijer and Kaempfer, Western medicine came to be viewed in Japan with increased interest, at least in so far as certain specific curative techniques were concerned. In fact, other individuals of a 'scientific' bent who were not themselves interpreters but who had either studied directly with or had observed the interpreter-physicians at Nagasaki began to practise or write about facets of Western-style medicine. Moreover, official recognition of these efforts even culminated in the appointment of several practitioners of Western-style medicine as *bakui* (physician to the Bakufu).

One of the most important of the non-interpreter, Nagasaki physicians was Arashiyama Hoan (1633–93) who was the son of a merchant from Chikuzen. Hoan had served as a doctor for the ruling Matsuura family at Hirado. In 1661 with the help of the Matsuura daimyo, Hoan went to Nagasaki to pursue the study of Western-style medicine. In 1665 he received a certificate of medical proficiency from Daniel Busch, the physician in residence at Deshima.³⁶ Some years later Hoan moved to Kyoto where he was appointed to the Buddhist priestly rank of *hogen* and changed his name to Arashiyama from Tomoda.³⁷ Hoan's book *Shinkokuchiho ruiju tekiden*³⁸ (Explanation of various foreign methods of medical treatment) (1683), which discussed the causes of sickness and outlined various diagnoses, was for years after the basic text for Dutch-style medicine. Arashiyama Hoan's disciple, Katsuragawa Hochiku (1661–1747) was summoned to Edo in 1690, and made attending physician to the Tokugawa household,³⁹ and Hochiku's descendants remained renowned for their medical skill throughout the Tokugawa Period.

Kurisasi Doyu (1660–1726) was the heir to his family's particular medical technique, the *Kurisakiryu* (Kurisasi-style), which was initiated by his grandfather who at the age of 9 made a trip to Luzon where he studied medicine. Doyu received his appointment as physician to the shogun in 1691,⁴⁰ and he became very well known to the Dutch. He visited them often asking about certain treatments and medicines and frequently came to the *Nagasakiya* at night bring-

ing his sons and disciples to meet the Hollanders. Also officially appointed in 1691,⁴¹ together with Kurisaki, was Yoshida Jian (1644–1713) who was from Dazaifu and who had studied at Nagasaki. As founder of the *Yoshidaryu* (Yoshida-style) Jian has two writings to his credit: *Sangokuryugeka densho* (Book transmitting the surgical methods of three countries) and *Geka shinden* (The true heritage of surgery). Two other co-workers of Kurisaki Koyu who also received appointments to Edo from Nagasaki were Murayama Jihaku (1647–1707), a physician who had also studied at Nagasaki and whose techniques were set down in *Murayamaryu geka zensho* (Complete record of Murayama-style surgery), and Fukami Kyudayu (Ko Gen'yu) (1690–1769), a descendant of Ming refugees in Japan and son of the author Fukami Shin'uemon (Ko Gentai) (1640–1723), who became *goshomotsu bugyo* (official librarian).⁴²

Kasuparuryu, *Nishiryu*, *Narabashiryu* as well as *Arashiyamaryu*, *Kurisakiryu* and *Murayamaryu* are all usually categorized as *Komoryu* ('Redhair-style').⁴³ *Komoryu* encompassed principally traditional Chinese medicine, some *Nambanryu* practices and a smattering of Dutch techniques. Therefore, the contents of these 'schools' were a somewhat heterogeneous mix transmitted by word of mouth, oral translations, practical lessons, certain pharmaceuticals, a few books, etc. The theory, however, was still based on Chinese theory. Thus, Western-style medical techniques as employed in Japan had, of course, no systematic or theoretical character. However, it should be noted that *Komoryu* surgery through such families as Nishi and Katsuragawa had penetrated the privileged world of the physicians to the shogun.

The importance of the influence of these early Nagasaki medical pioneers cannot be underestimated in any study of the development of *Rangaku* in Japan. The significant concept which was propagated by the teachings of these men was the practical value of the application of Dutch medicine. For despite climatic differences, differences in clothing and food, and the tremendous distance separating the two lands, Dutch medical and surgical techniques could be successfully employed in treating Japanese ills. Nevertheless, neither among the interpreters nor among their pupils was there any diminution of the overweening predominance of the deep-rooted Chinese academic tradition which was the basis of the practice of medicine in Japan.

By the turn of the eighteenth century the role of the Nagasaki interpreter in Tokugawa society had become more clearly delineated.

His principal function and value was as an intermediary, first of all in an official capacity for the annual trade with the Netherlands,⁴⁴ for the visits of the Dutch to the shogunal capital and for the day-to-day interchange between the Hollanders on Deshima and the bureaucracy of the Bakufu; and secondly, and unofficially, as intermediary for all those Japanese who, for whatever reason, wished to have contact with the Dutchmen either at Nagasaki or at Edo. It is not surprising, therefore, that as a result of these two major activities, a modicum of elementary scholarship began to appear within the interpreter group.

Yet it is curious that the interpreters had as much latitude as they did since this was an era during which Tokugawa power was at its height, a fact which signified that there was great and continuing emphasis on anti-Christianity (anti-Westernism). The Dutch interpreters were particularly suspect under such circumstances in view of their daily contacts with the Hollanders who despite their having been permitted to remain were still looked upon with a very jaundiced eye.

It was also dangerous for the interpreters to express any opinion that, because of their official status, might be considered sympathetic to the European *Weltanschauung*. Academically, too, these Nagasakians worked under extremely difficult conditions. Their language study which was the basis of their *raison d'être* was at best meagre since they had no grammars, dictionaries or competent instruction. Even the introduction of the Roman alphabet was a very precarious proposition. Nevertheless, as has been seen above, working on a regular basis with the Hollanders at Nagasaki in an official capacity, the interpreters were able to develop some level of competence in the Dutch language and in some instances to go beyond their assigned tasks and to acquire a certain quasi-scholarly knowledge of the West. And, though they have sometimes been criticized by modern scholars as 'hobby *Rangakusha*', it was these same Nagasaki interpreters who laid the foundation not only for the study of Western medicine in Japan but, as will be seen, for the investigation of western astronomy and of Western-style systematic language study as well.

VI

Arai Hakuseki and intellectual developments in Genroku and Shotoku

The Genroku (1688–1703) and Shotoku (1711–15) periods were times of gradual change in the policy of the Bakufu from militarism to intellectualism, with the *bushi* class as the centre of this gradual transformation. Genroku–Shotoku is often referred to as the Japanese Renaissance because of its brilliant achievements in literature and in the arts. These accomplishments came out of an era of political calm and of a burgeoning urban society which provided a new framework for the many cultural advances. Moreover, in a period of peace, both internal and external, the samurai, bastion of Tokugawa control, were officially encouraged to turn their energies from increasingly sterile military involvements to the pursuit of scholarship. According to Sansom:

By this time the various economic changes . . . had brought the commoners to a position of real importance which the military class no longer enjoyed. The samurai still had their dignity, the consciousness of high social standing; but the commoners [*chonin*] had most of the money and most of the fun.¹

While some samurai clung to their old privileges and tried to preserve some semblance of their traditions, some *chonin* too, without any prestige to maintain and practically unfettered by rigorous codes of conduct, became a source of scholarship and of new ideas.

Meanwhile, the role of Buddhism in Japan had been greatly weakened. The power of the Buddhist church and priesthood had been broken by Nobunaga and Hideyoshi, and Ieyasu by his institution of Neo-Confucianism as the official philosophy left Buddhism only a shadow of its former potency. Yet Buddhist concepts and ideals pervaded Japanese life and were often to be found as components of the various new eclectic philosophies which began to evolve.

This Genroku–Shotoku period was perhaps the most flourishing for the development of learning prior to the Meiji Restoration, and Western studies seeping into Japan by way of Deshima rode the waves of the *kogaku* (love of learning) era typified by Tokugawa Mitsukuni²

(1628–1700) of Mito³ and the fifth Tokugawa Shogun Tsunayoshi⁴ (1646–1709), ruler from 1680 to 1709. For the first time it was an occasion from the standpoint of Western studies when attention was paid to scholarship as scholarship, and this must be particularly noted in the history of Dutch learning, for this was also the era of the beginning of *Edo Rangaku* (Dutch studies at Edo).

There was activity generally in the scholarly world, particularly in the realm of speculative philosophy. In order to draw more closely the parallel between these new ideological trends and the appearance of *Rangaku* it is important to note that the new developments in society gave impetus to a number of original thinkers who may perhaps be grouped under the term 'society directed'. That is, these new philosophers had in common an emphasis on personal activity and practical reforms in contrast to the speculative emphasis of the orthodox Confucianists and the other worldliness of Buddhism. These new patterns of thought could be related directly to the realignments which were taking place in the social order. This was particularly true in so far as the *chonin* class increased not only in number but in independence from the feudal milieu as well.

Numerous new schools of thought developed among the Confucian scholars. Of special significance was the scepticism among certain philosophers concerning the orthodox teachings of the officially accepted doctrines of Chu Hsi. Ito Jinsai⁵ (1627–1705), Ogyu Sorai⁶ (1666–1728) *et al.* looked beyond Sung Neo-Confucianism to early Han for purer Confucianism. This *kogakuha* (school of ancient studies) intended to fathom the true spirit of Confucianism by going back to the original sources and by ignoring modern reinterpretations. Men like Sorai and Jinsai used such re-examinations, however, not only from the standpoint of philosophical speculation but as vantage points from which they could comment upon current developments on the Japanese social scene. Regardless of their varying opinions of human nature these *kogakusha* all agreed that man requires good examples and inspiring motives in order to reach his full potential. Jinsai wrote: 'Whatever doctrine there be, if it does not contribute to the government of the state, if it does not help people in the daily practice of human relations; that doctrine is evil and criminal.'⁷ Something of the practical influence of *kogaku* can be seen in the following quotation:

Since *kogaku* depends on basic research in the original classics, when its influence is strong, it probably induces a method of research which examines

everything by trying to inquire into the original source without grasping the conventions, scholarly theories, or reasoning of later generations . . . Ito Togai⁸ (1670–1736) who introduced the study of original meanings applied this not only to the classical institutions but to language and literature, as well. Without forgetting economics and practicality he brilliantly educated the younger generation in these other fields, and he was a famous scholar–educator who passed out from his gate various specialists and technicians. When Aoki Kon'yo studied Dutch learning . . . he went back directly to the original sources, and it is thought that this sprang from a style of learning which is said to want to seek out phenomena and real reasons.⁹

Scholars active subsequently in the Kyoho (1716–35) era of Dutch studies were educated in the spirit of inquiry and speculation of Genroku and Shotoku. It was this same Genroku–Shotoku era which nurtured Arai Hakuseki (1657–1725) whose writings were not merely those of a curious member of the *kogaku* coterie. Hakuseki was a celebrated man of letters, historian and Confucian scholar. In the latter capacity he entered the service of the sixth shogun-to-be Ienobu (1662–1712) (shogun 1709–12) in 1693 as counsellor and later served the following Shogun Ietsugu (1709–16) (shogun 1713–16) in a like role. His most important contributions to Western studies were two books: *Sairan igen* (Collection of strange things) (1708), the first systematic Japanese world geography book which contains what is probably the first description in Japanese literature of a republican form of government, and *Seiyo kibun* (Report on the Occident) (1713) which was based on interviews held with the Italian Jesuit Giovanni Battista Sidotti (1668–1715). Neither of these works of Hakuseki was actually published during the Tokugawa Period since they dealt with matters to some extent related to Christianity, but they circulated in manuscript and were frequently copied by scholars.

Sidotti, born in Palermo and ordained at Rome, sailed from Genoa for the Far East in 1703. After a few years in Pondicherry, India, and in the Philippines, he left for Japan where he intended to carry on missionary activity despite the government ban. On 13 October 1708, Sidotti landed on Yakushima¹⁰ where he was immediately taken into custody and removed to Nagasaki. After one year he was taken to Edo and confined until his death (burial alive for converting to Christianity an elderly married couple who were his servants) at the so-called *Kirishitan yashiki* (Christian residence)¹¹ where Hakuseki interrogated him.

Mention must be made of the important service rendered by Hakuseki's interpreter Imamura Gen'uemon Eisei (Ichibei) (1671–

1736). Eisei was born at Nagasaki of a distinguished interpreter family. His grandfather Shirobei had been an interpreter when the Dutch were still at Hirado, and his father Ichizaemon who followed the same profession at Nagasaki had advanced to the rank of *naitsuji-kogashira* (vice-chief of the interpreters who took a commission for interpreting during the annual sale of Dutch goods). Eisei studied Dutch from childhood, and in 1695, at Deshima in the quarters of the *opperhoofd*¹² and in the presence of the Dutch physician in residence Mathijs Racquet and an *otsuji*, he passed an examination and was admitted to the interpreter corps as a *keikotsuji*.¹³ Advancing rapidly he became a *kotsuji* in 1696¹⁴ and an *otsuji* in 1707.¹⁵ In 1708, he was assigned to Sidotti.

Considering the breadth of the topics covered by Hakuseki's *Seiyo kibun* the interpreting had to be extremely scholarly and detailed. Naturally the question arises in what language the interviews were conducted since Sidotti knew neither Japanese nor Dutch. The very involved answer was that Eisei used his Dutch to understand Sidotti's Italian, and Sidotti used his Latin to understand Dutch. Since Eisei was with Sidotti from the time of his arrival and was a very apt linguist he probably could converse in some detail with Sidotti by the time of the interviews of Hakuseki. Likewise Sidotti probably learned some Japanese. Yet Hakuseki seems to have had no idea of the difficulty of the procedure. For example, he said before the interrogation that it was simpler for a Dutch interpreter to understand Italian than for a Nagasaki man to speak to one from Oshu, and afterwards he said that it was easier than he expected. However, it is obvious that were it not for Imamura Eisei, the writings of Arai Hakuseki, and the important effects they produced might never have occurred.

Hakuseki's importance to *Rangaku* is that he was the first Japanese scholar as such, and one with official status, to investigate in a serious and purposeful fashion information from the West. Although his principal source, as noted above, was Fr Sidotti, he was by no means his only source. For on four of the Dutch *hofreisen* to Edo, Hakuseki had an opportunity to meet with the Hollanders. Particularly useful were his encounters with the *opperhoofd* Cornelis Larkijn (at Deshima 31 October 1711–20 October 1712 and 7 November 1713–28 October 1714). Although Hakuseki is known to have compiled a written glossary of some 300 Dutch words (nouns and adjectives), Hakuseki did not speak any Dutch, and the glossary itself was transliterated into katakana by Imamura Eisei. Like most of his predecessors as well

as many of his successors, therefore, Hakuseki was linguistically dependent on the Nagasaki interpreter corps. Similarly, he was dependent on them for much of the information on which he based his many writings, that is on what the interpreters told him about many of the topics which interested a man of his scholarly concerns. Nevertheless, the breadth of his bibliography gives clear testimony to the remarkable ability of Hakuseki to utilize and systematize all the knowledge he acquired, whether from Sidotti, the interpreters, the Dutch at Edo or works in Chinese by Ricci and his fellows.

Hakuseki in addition to the two aforementioned works also produced *Toonfu* (Notes on Eastern sounds) (1719) which gives an explanation of the pronunciation of Japanese characters, *Seigaku suimon* (Conjectures and answers about Western learning), *Seiyojimbutsushi* (Record of Western personal qualities), *Oranda kiji* (Things Dutch), *Oranda judoki* (History of the natural features of Holland), *Oranda ko* (Opinions of Holland), *Natoshi* (Record of the Southern Islands) (1719) which gives a description of the genealogy and geography of the Ryukyu Islands, and *Ezoshi* (Record of Ezo) (1720), an investigation of Ainu history and of Hokkaido.

In his writings Hakuseki seemingly fearlessly discussed religion, geography and foreign political systems. He advocated an accurate understanding of Christianity rather than a fear of it saying, 'Even if we permit this [Christianity], it will not harm our regular religions'.¹⁶ Perhaps in this view he took his cue from Sorai who wrote: 'Christian books should be placed in the official library, and Confucianists should examine them and should study the false religions.'¹⁷ Hakuseki fully realized the excellence of Western techniques, and he at once made the point of differentiating these from Christianity. And he demonstrated his belief that Western sciences could progress while Christianity remained under controls. Hakuseki separated the natural sciences from Christian ecclesiastical authority and referred to the value of the former and the 'non-scientific' attitude of the latter. He denounced the general prejudice in Japan that Western culture and Christianity were one. 'In Europe they know the concrete, not the abstract.'¹⁸

As a view of Western culture this continued to be believed in Japan long after the appearance of Western learning. In this view Europe's civilization was valuable, but Christianity was a separate compartment; and after it was made clear that there was useful knowledge which could be taken in from the Occident even under the ban on

Christianity, the groundwork was laid for the further introduction of European studies. In this context Arai Hakuseki's writings mark him as a true pioneer of the 'legitimization' of the study of the West in Japan.

VII

Tokugawa Yoshimune and Western learning

As a result of the work of the interpreters in the latter half of the seventeenth century and of the research of Arai Hakuseki in the first decades of the eighteenth century the fact that information of a practical and valuable nature might be obtained from the Hollanders was better understood. With the diffusion of this knowledge at Nagasaki and Edo, the curiosity of an increasing number of scholars was being aroused about foreign systems, products and customs. Although his exact motives are not entirely clear, it may be presumed that the eighth Shogun Yoshimune (1684–1751), shogun from 1716 to 1745, decided to lend Bakufu support to further investigations along these lines because of his own inquisitive nature and his desire to see certain practical benefits accrue to the government. It is highly unlikely that Yoshimune acted in response to any scholarly pressures.

The Neo-Confucian system which Tokugawa Ieyasu had planned to propagate mainly concerned itself with morals, household management and statecraft. From its inception this was in a sense practical knowledge, but if one speaks of concrete or everyday practices, encouragement for what might be called the applied sciences was almost non-existent. In general these sciences (medicine, botany, agronomy, astronomy, mathematics, etc.) could be best characterized as merely assembling information without obtaining any positive grasp of, for example, natural laws, and particular knowledge was not systematized to any degree. These were tasks which fell to Western learning.

Beginning with Yoshimune the Bakufu itself adopted an official policy of increasing its knowledge of Western science. This was a part of Yoshimune's *Kyoho no Kaikaku* (Kyoho Reform).¹ According to E. Herbert Norman,

Yoshimune is generally admitted by historians to have been one of the more industrious and competent of the Tokugawa Shoguns. He is singularly reminiscent of Augustus Caesar in his grandiose programme of public works, his sumptuary edicts against luxury and ostentation, his pathetic confidence in the power of legislation to canalize along safe channels all intellectual and literary forces.²

At this time certain inadequacies of the Tokugawa system were becoming more evident. This was a period of increasing prosperity of the merchant class, of the spread of a money economy, of the entry into the farm villages of commercial economy and of the growth of usury capital. All of this occurred despite Bakufu decrees of frugality and decrees attempting to hold down commodity prices, and, since the national treasury was being depleted, controls were strengthened. However, this tightening of controls led to the stagnation and decrease in rural population, the emigration of the peasants to the cities and *ikki* or peasant uprisings. These latter were directly threatening to the stability of the system, and, accordingly, Yoshimune in his *Kyoho no Kaikaku* gave special attention to economic policies.

He planned to increase agricultural production by opening new areas to cultivation under his so-called *Shokusan Kogyo* (Enterprise to increase production); in 1727, under the leadership of Ochiai Sonzaemon of Satsuma sugar cane was cultivated at Suruga and Nagasaki, and at Nagasaki sugar refining was learned from the Chinese; at the recommendation of Aoki Kon'yo sweet potatoes were grown in the Kanto plain near Edo; wax-trees (*Rhus succedanea*) were planted; large-scale animal husbandry was encouraged. Concurrent with these developments Western learning was officially sponsored as a matter of practicality, and in this regard Yoshimune evidenced great interest in information from the West, beginning in 1717 with the first visit of the Dutch to Edo after he assumed office. The particular interest of Yoshimune in the astronomical, calendrical and climatic scholarship of the Occident was because of their intimate relationship with agriculture. This approach corresponded well with the aforementioned positivistic tendencies of his time.

People of the red-hair country customarily do things by mental reckoning and by reason; they only use implements they can see; if a fact is not certain, they do not say so, and they do not make use of it; having a high regard for the sun, they do not talk about the 'upper regions'; they do not believe in Buddhism, and they do not accept mysterious things.³

*Astronomy and Calendrical Science*⁴

In line with the traditional Chinese concept of the ruler's responsibility, Yoshimune was conscious of the importance of astronomical and calendrical techniques to agriculture and wanted the calendar to

be made as accurate as possible. To that end he summoned the Bakufu physician Takebe Hikojiro (Katahiro) (1664–1739), Nakane Genkei (Jouemon) (1662–1733) from Kyoto and Nishikawa Joken from Nagasaki and questioned the three of them about astronomy and the calendar. Takebe Hikojiro had earlier been sent by Yoshimune to study mathematics with the brilliant mathematician Seki Takakazu (1642–1708). Hikojiro's star pupil was Nakane Genkei who after studying with Hikojiro at Edo took up a position at the mint in Kyoto. Genkei's writings include *Tenmon zukai hakki* (An enhancement of the *Tenmon zukai*) (published in 1739), derived from a book by Iguchi Tsunenori, *Tenmon zukai* (Illustrated explanation of astronomy) (1689), and *Kowa tsureki* (Chronology of the Japanese empire) (1714).

Yoshimune also had Genkei translate *Li suan ch'uan shu* (Complete book for computing the calendar) compiled in 1701 by the Chinese scholar Mei Wen-ting (1633–1721). However, since this was only an abridged version, Nakane Genkei is supposed to have addressed the shogun as follows:

In Japan because of the prohibition of Christianity, any book that may have a few words on Catholicism or Matteo Ricci is burnt in Nagasaki. We have, therefore, scarcely any book on the study of the calendar. Should you truly wish to have this branch of science studied, I beg of you first to lift the ban on foreign books.⁵

Thus the advice of Genkei was primarily responsible for the end of the prohibition of those Western books which contained no mention of religion and were written in or translated into Chinese. Genkei impressed the shogun with the important need for these works if a scientific revision of the calendar was to be carried out. And in 1720, Yoshimune permitted the importation of these writings:⁶

Chiao yu lun (Dialogues on friendship (imitation of those of Cicero)), M. Ricci (1595).

Tse liang fa i (Practical geometry (lessons given by Ricci on the theory of astronomical measurement with the aid of triangle-rectangles)).

Kou ku i (Development of the theory of the triangle-rectangle with an arithmetical illustration of the geometric qualities), M. Ricci.

Hun kai t'ung hsien su shuo (Development of the sphere), M. Ricci (Peking, 1607, 2 vols).

Tung wen suan chih (Practical arithmetic), Li Chih-tsao (Leon) (Peking, 1614).

Huan jung chiao i (Isoperimetrical drawings), dictated by Ricci and recorded by Li Chih-tsao (Peking, 1614).

Chi ho yuan pen (Geometrical principles), translation of the first seven books of Euclid by Hsu Kuang-ch'i (Paul)⁷ (Peking, 1605).

Chien ping i shuo (Description of an instrument giving orthographic projections of the heavenly sphere), Sabbatino de Ursis S.J.

T'ai hsi shui fa (European hydraulics), S. de Ursis (Peking, 1612).

Despite the obvious fact that these books were all over 100 years old, they were eagerly seized upon by Japanese scholars, especially since Chinese was a language they all were trained to read, and the information they contained generated an increased spirit of inquiry about Western science. However, there was no general circulation of these books, and the lifting of the former ban was hardly known beyond the associates of those whom Yoshimune had officially asked for advice on calendar revision. Thus, the purpose of Yoshimune's action was solely to try to facilitate accuracy in Bakufu-sponsored practical undertakings and not to 'enlighten' or to 'educate' the Japanese public.

In 1717, Yoshimune himself received the Dutch on their annual visit to Edo. They were asked about astronomical computations, and they were shown an astrolabe which was later sent to Nagasaki. On 12 October 1717, the Nagasaki *bugyo* sent the astrolabe to Deshima and asked if there were any among the Hollanders who might know how to use it. The sailors Nooij and Rooseboom were summoned and together with Moreels, an accountant who was a technical expert, they examined it but could not understand how to use it. Saying this was probably not an astrolabe, the interpreters took it back.

In the spring of 1718, at Edo the Dutch were asked among other things the position of the south polar star; but, since they were not expert in astronomy, and since there were many stars at the south pole, they replied that they did not know which was the south polar star thus averting responsibility for a possibly incorrect answer. When they came to the capital the following year, 1719, they were visited by two astronomers and were questioned about the heavenly bodies. In 1722, at the end of May, a document came to Nagasaki from Edo, and the Dutch were asked whether or not they had a telescope which could bring into view a person 4 Dutch *ri*⁸ away, and, if not, they were ordered to get one either from Batavia or from Holland.

In April 1735, when the Hollanders were at Edo, they were visited

by Fukami Kyudayu (see chapter V above), and they answered his many questions on astronomy. In January 1736, Imamura Eisei, the famed interpreter for Hakuseki, came to Deshima and asked whether the Dutch had a quadrant which might be sent to the shogun; and in April 1736, at Edo they were shown a quadrant belonging to the Nagasaki *bugyo* and were asked how to use it. On this occasion Kyudayu asked about the Dutch calendrical system, the revolutions of the moon, the disposition of the stars, the reasons for solar and lunar eclipses, etc., which the Dutch found to be very annoying, as they so noted in the *Dagregister* for that year.⁹ On the list of things required by the shogun for 1736, one Hollander who could make a calendar was requested. In the spring of 1737, when the Dutch came to Edo, Kyudayu posed his usual questions, but this time Dirk van Horbag, the secretary, who for the past year had particularly applied himself to the study of astronomy, was able to provide some of the answers. The following year, 1738, while at the capital, the Dutch were again visited by Kyudayu who asked where and by whom in Europe calendars were made and about the reasons for the new moon, the full moon, high tide, etc. In 1743, Kyudayu again asked about astronomy with particular emphasis on comets, and in 1745, 'Tijoesiro'¹⁰ asked about astronomy again. This 'Tijoesiro' was Nishikawa Chujiro (Seikyu) (1693–1756), the son and heir of the aforementioned Nishikawa Joken. Chujiro had come from Nagasaki to Edo where he taught Western chronology, and in 1735 he received an official appointment from Yoshimune. In 1729, he translated *T'ien ching huo wen* (Interrogation on the heavenly system) (1675) by Yu-i from Fukien province. Yu-i was a pupil of a Chinese scholar who had been a close associate of an Italian Jesuit from whom he had learned a great deal about Western astronomy. In 1729 Chujiro wrote *Tairyaku tengaku meimokusho* (Brief extract of astronomical names).

In May 1744, while the *opperhoofd*¹¹ was at the capital, the shogun's envoy came to Deshima and asked how recently solar and lunar eclipses had occurred in Holland, and how much time difference there was between Japan and the Netherlands. The officials had asked the *opperhoofd* at Edo, but, since he did not have an almanac, this was difficult to compute. So the Nagasaki *bugyo* was ordered to ask the Dutch at Deshima. However, since there had been no new almanac brought from Europe since 1735, the *bugyo* too was unsuccessful in his quest for information. Apparently no calendrical expert was ever sent out from Europe as requested. At any rate, since detailed facts about

astronomy and calendars were of such great importance to both scholars and statesmen, it must have been extremely difficult for the Hollanders to satisfy the curiosity of their Japanese interrogators. Nevertheless, Yoshimune proceeded with his plans to construct an observatory, and one was built in 1744 at Kanda, Sakuma-cho.

Timepieces

Because of the obvious significance of timepieces in daily life it seems natural that Yoshimune was curious about them. In 1717, after the formal audience for the Dutch, a special attendance at the castle was ordered where various artefacts were inspected. After the Dutch descended to an anteroom, the Japanese brought out a timepiece which the Dutch were asked to open, but it was so old they were unable to make it budge. The following day they were again requested to open the watch, but the Dutchmen could not do so. On 14 April, the envoy of the Nagasaki *bugyo* came to Deshima and asked whether on the next ship a watch expert might be sent, but the *opperhoofd* Joan Aouwer (at Deshima 3 November 1716–24 October 1717; 13 October 1718–31 October 1719; and 1 November 1719–21 October 1720) answered that he did not know if this would be possible. Finally the Japanese themselves opened the timepiece; but, since the mechanism failed to operate, the Japanese asked the Hollanders to inspect it. However, the Dutch returned it saying that they could not understand the reason for its not working. At Deshima the records showed that this watch had been presented to the Bakufu as a gift in 1679, by the *opperhoofd* Dirck d'Haas (at Deshima 27 October 1676–16 October 1677 and 4 November 1678–24 October 1679).

At Edo in 1727, the *opperhoofd* Pieter Boockesteijn (at Deshima 15 October 1726–3 November 1727; 22 October 1728–12 October 1729; 31 October 1730–20 October 1731; and 21 October 1731–7 November 1732) was asked to show his pocket watch. On the trip from Nagasaki its chain was cut and its lens was dislocated, but, since the shogun wanted to see it, it was taken away, and the statement was made that since the official watchmaker would repair it, it should be left for the present. The next day Boockesteijn was asked how much he wanted for the watch, and he replied that a Dutchman could not accept money from a monarch, especially since the watch was in disrepair. The interpreter returned and said that the shogun wanted to borrow the watch temporarily in order to test whether the official watchmaker

could repair it or not, and the factor gave his consent. According to the interpreter, the truth was that the mathematical scholar and favourite of the shogun, Takebe Hikojiro, wanted to tinker with it himself.

As previously noted the Bakufu had asked that a watch expert be sent to Japan, and in 1734, a watch expert arrived bringing several watches. One of the officials came to Deshima with the Japanese watchmaker and had him view the inner workings of the watches. In 1736, a watch expert, Anthonij Kluijt, came to Japan carrying some sample watches for the shogun. Kluijt was ordered to stay at Nagasaki for one year, and in the autumn of the next year he was permitted to leave. Clearly Yoshimune's great interest in timepieces was closely intertwined with his hopes for improving the methods of measuring time in Japan.

Geography

Yoshimune sought information on the geography of foreign countries, and on 11 December 1716, the interpreters Imamura Hachizaemon and Imamura Eisei, the *otona*, the *metsuke* and others came to Deshima bringing with them one unidentified elderly *ronin* who was said to be a scholar. They sought the assistance of the *opperhoofd* in putting into Japanese characters the names of important cities and places on a map of Europe which the scholar was carrying. The accountant, Simonsz. Van der Werff, was selected as the Dutchman best qualified for the assignment, and he helped them though the task took several days. On the 24th the *bugyo* himself came to Deshima, entered Van der Werff's room and inspected the work. The old scholar and his pupils completed their work on 6 January 1717. The name of this unidentified learned man is not known, but perhaps it was Nishikawa Joken.¹²

On 2 September 1729, an interpreter came to the Dutch settlement and, saying he had been ordered there by the shogun's chief adviser, asked the area of the seven provinces of the Netherlands and of other European countries even including Sicily and Sardinia. In the spring of 1730, when the Dutch were at Edo, Fukami Kyudayu came to them on 20 April, showed them a map of the siege of Smolensk in 1610 and asked for an explanation of it. Though the map was inscribed in High German, the physician, Harbert Evers, who knew High German, did his best to decipher it.¹³

Shipping

In January 1718, the interpreter Imamura Hachizaemon came to Deshima bringing from the shogun a long document in which he requested information about shipping, sea lanes, etc. Later Imamura Eisei arrived in order to copy pictures of ships and of sea battles which had hung in the *opperhoofd*'s quarters for many years. He said that he was to send his copies to Edo. Eisei also asked specifically for pictures of European ships and inquired about length, width, depth, masts, gear, etc. But the *opperhoofd* only replied to certain questions stating that shipbuilding was a specialized craft, and, since there was now at Deshima no one who could build ships, he could not fulfil the shogun's wishes, and he deeply regretted this. When the *bugyo* inspected the Dutch vessel *Ternissen*, he had a drawing made of it and asked the *opperhoofd* whether such a ship could be ordered for the shogun. The *opperhoofd* answered that this might not be impossible at Batavia, and, if it were, that the order could be taken care of in Holland itself. A few days later Eisei came again and asked that a list be made of the maritime flags of the various nations for forwarding to the capital.

Weapons

In the spring of 1721, while the Dutch were at Edo, they were asked if they knew how to discharge a pistol and whether they could fire it on horseback. The Hollanders all said they did not know how to ride and declined, but the next day an interpreter came who reported that they were to come to the castle, fire a pistol and ride horseback. On 4 April, at a special attendance at the castle they were ordered to fire a pistol, and the accountant, Hendrik Rijkman, tried it. Then when they were ordered to mount a horse, and when their refusal was rejected, Rijkman got on the horse and made one turn around the riding ground. The shogun was there incognito and saw the proceedings. So, on 31 October 1721, when the list of things required by the shogun was presented, he requested that, if there were at Batavia a person skilled in firing a gun while on horseback, such a person must come to Japan.

In April 1723, at Edo a retainer of the shogun asked whether the Dutch party had among them any persons who knew how to wear Western-style helmets and armour or if they had seen such persons. The assistant, Gerardus Bernardus Visscher,¹⁴ replied that in Batavia

he had seen the helmets and armour of common soldiers, and, while he himself had not donned them, this was probably not difficult. According to this retainer the shogun had a suit of European armour but did not know how to wear it. Thereupon Visscher said that, if the shogun wished it, he (Visscher) would attire himself in this armour. On 7 April, at the house of the *bugyo*, while paying their respects, two Buddhist priests emerged (one was probably the shogun in disguise), and the Dutch were told to don the armour before their eyes. So Visscher, aided by the physician, Willem Ketelaar, put it on and walked around the room two or three times.

At Deshima in May 1723, Imamura Hachizaemon said that the following year the shogun wanted the Hollanders to send to Japan helmets and armour of a thickness which a bullet could not penetrate. Though the *opperhoofd*¹⁵ did not know whether they had any or not, he passed the word along to Batavia, and it seems that these items were sent in 1723. On 20 November of that year the *metsuke* came to the Dutch and asked whether there was someone in the group who could shoot and test whether the armour being presented to the shogun was bulletproof or not. The *opperhoofd* replied that the armour was not bulletproof, and on 3 December the *bugyo* himself visited the Hollanders and had a Japanese shoot at the armour, and, when the bullet penetrated, the armour was returned by the *bugyo* who was extremely disappointed. The next day the Dutchmen were asked of what the pierced armour was made, and they answered that it was iron, not steel. In 1732, two bulletproof suits of armour were given to the Bakufu, and among the gifts for 1733 there were two Dutch coats of mail.¹⁶

From the standpoint of usefulness to the nation Yoshimune viewed horses and equestrian techniques as of equal importance with the other new devices and inventions from the West. After assuming office he was particularly interested in the importation of excellent animals and of foreign horsemanship. So horses were brought over from Korea and China, and Yoshimune studied the riding techniques of the foreigners; the Dutch too were questioned about Western horses, and, as a result of these interrogations, Western horses were imported, and Dutch riding masters were engaged. The first Western horses were ordered in 1723, but did not arrive until 1725 in the company of the riding master Hans Jürgen Keijser (Keyserling) (1696–1736), a native of Hamburg, who stayed until 1727, his place then being taken by Godfreed Kriedman. But in 1727, after

Kriedeman died at Deshima, Keijser returned. While at Deshima he gave riding lessons, and in 1729, he went to Edo and took up residence in the Hama Goten (Hama Palace) where he taught horsemanship to a Bakufu equestrian specialist Tomita Matazaemon. The same year Imamura Eisei who was Keijser's personal interpreter was ordered to write down the equestrian techniques and equine medicine he had learned over the years from Keijser. Eisei's grandson, Imamura Daijuro subsequently compiled, edited and published these notes as *Oranda bajutsu sho* (Book on Dutch horsemanship) (1736).

Keijser returned to Nagasaki in 1730, and again in 1734 he came to Japan bringing six Western horses and a carriage and arrived back in Edo for a six-month stay the following year. On his first visit Keijser had been only a stable boy, but he now held the rank of ensign. On 30 August 1735, he left Edo, but on the return journey to Nagasaki he was poisoned and robbed of all his possessions. When the shogun heard the news the following year, he ordered full restitution to be made to Keijser's family.

In 1737 and 1738, the riding master Jan Jephart Werner brought some horses to Japan and accompanied the *opperhoofd* G. B. Visscher¹⁷ to the capital where at the palace riding ground Werner presented a demonstration of his equestrian techniques. All told, Yoshimune imported about thirty horses, both stallions and mares, from Holland, and from that time on the breeds improved as did the horsemanship.¹⁸

Medical techniques

The Koishikawa Yakuen medical herb garden was established in the time of Yoshimune. Medicinal plants of East and West were cultivated, Western medical techniques were officially encouraged and the study of Western-style medicine developed. Every spring when the Dutch came to Edo, Japanese physicians visited the Dutch at the *Nagasakiya*. On 17 April 1717, for example, five doctors came and interrogated the Dutch physician, Willem Wagemans. Every year without fail Kurisaki Doyu came with his sons and disciples and held long talks with the Hollanders. Private friendships and exchanges of gifts characterized the relations between the physicians of the two cultures.

On 16 May 1724, Imamura Hachizaemon came to Nagasaki bringing a tattered medical book and asked the Dutch physician about the

treatment for a tumour on the neck. The book was said to have been sent from Edo at the Shogun's command and was the same Dutch translation of Paré's book on surgery referred to above. Though the book was very stained and out of 900 pages only 128 pages remained, Hachizaemon asked that the book's index be written in Japanese, and this was begun. In August 1724, the shogun ordered an anatomy book, one which had been originally published nearly half a century earlier.¹⁹

Three patients were brought to the Dutch physician Ketelaar on 8 April 1725, and he was asked for diagnoses. The ailing Japanese were poor people who worked in the seed plot in the medicinal garden. The Dutch physician made a diagnosis and a report, and again on the 10th he was requested to diagnose the illnesses of three others.

In the spring of 1726, when the Hollanders were at the capital, Kurisaki Doyu asked them about distilling methods. On the day of attendance at the palace, in the waiting room distilling bottles presented the year before were produced, and the Dutch were questioned about them. Doyu died that autumn but his son Kurisaki Shoken (1708–37) continued to quiz the Dutch on every visit to Edo. In 1727, in addition to Shoken, Niwa Seihaku (1700–52) came to interrogate the physician David Drinkman about medicines and techniques. Seihaku from Matsuzaka was a pupil of the famous Japanese botanist Ino Jakusui (1655–1715), compiler of *Shomotsu ruisan* (Classified collection of plants) which was sent to Edo in 1719. Yoshimune had Seihaku, who was in the service of the shogun, continue this work, and by 1747 he completed 1,514 folios. During these years Seihaku, at Yoshimune's order, together with another of Ino's pupils, Noro Genjo (1693–1761) (see chapter VIII below), and also with Abe Shoo (d. 1753), who had been a castaway in China where he learned botany, collected botanical specimens throughout Japan. They went to Nikko, Hakone and Fuji and to the islands of Oshima, Sado and Ezo and made many discoveries which were significant for the study of plant life. At the Koishikawa medicinal garden Seihaku supervised the cultivation of ginseng, sweet potatoes and sugar cane and made an important contribution to the Bakufu's attempt to increase and to diversify agricultural production.²⁰

Animals

Yoshimune was extremely curious about birds and beasts which had

not previously been seen in Japan. Both in 1717 and in 1718 at Edo the Dutch were questioned about the name and habitat of each animal listed in Johnston's animal book. The copy of this work which was produced for their perusal was the same Dutch translation which the *opperhoofd* Indijck had given the Bakufu in 1663; but the book had been kept in the secret library of the shogun, and it was in perfect condition.

Yoshimune was an inveterate hunter, and the Hollanders presented two hunting dogs to the shogun in 1717, and, since these dogs were very satisfactory, two more of the same were requested and were delivered in 1720. In 1721, 6 of these dogs, 2 males and 4 females were ordered, and in 1722, the same order was repeated. Yoshimune also imported water-dogs and six brindled dogs. The Dutch were asked in 1717, if they used falcons for hunting and, if so, how. The same year at the command of the shogun small white male and female pigs were sent to Edo from Deshima. At various times the Hollanders were requested to bring to Japan various rare and diverse animals of the world. Complying with this order the Dutch presented civet cats, cassowary birds, peacocks, ostriches, turkeys, macaws, Javanese sparrows, mynah birds, black chickens, etc. They were also interrogated about the varieties of fishes listed in Johnston's book.

Plants

Japanese physicians evidenced interest in medicinal plants, and Japanese botanists were curious about all manner of rare plant life. Yoshimune's interest, however, was not limited to medicinal plants; he wanted to import and to have cultivated new flowering plants and fruit plants. The Dutch were asked for information about shoots of pepper trees, coconut palms, clove trees and nutmeg trees. In 1725, they brought to Japan oak shoots and eighteen medicinal plants which the Japanese tried to grow at Koishikawa. Every year different seeds and plants were ordered, and it is very possible that some of their descendent genera remain in Japan today.

Foods

Yoshimune was extremely curious about Western foods. On 21 March 1724, samples of all foods brought to Edo by the Dutch were ordered assembled at the palace. Each item – biscuits, butter, etc. –

was wrapped separately in paper and marked with its name. Three days later some Buddhist priests came from the shogun and asked the Hollanders how to prepare Western food in the Western fashion. Three priests with interpreters came to the *Nagasakiya* on 25 March and watched the preparation of the food; after it was cooked, the Dutchmen and their guests sat at a dining table, ate the Western-style food and drank Western wine.

In 1725, the Dutch were told to bring to the palace a table cloth, spoons, knives, forks and beverages, and in the presence of the shogun they were commanded to eat and drink. The next day three priests, two of whom had been present the preceding year, brought gifts of pheasant and sea-bream, had them cooked and served, and recorded the details of the proceedings. That both of these trial meals were ordered by Yoshimune is clear from the writings of that time.

On 15 April 1725, the Hollanders were requested to provide the shogun with 130 *momme*²¹ of butter which was put in jars, wrapped in paper and presented in a package bound in paper cord. At Nagasaki on 5 September 1725, the Dutch were asked to send to the shogun 1 *kamme* of meat pickled in salt and 600 *momme* of smoked meat. However, since the weather was warm, there was a possibility of the salted meat spoiling, and the Hollanders so warned the Japanese, but on 6 September these two items were sent as requested.

On 3 April 1726, again at the capital, four priests came to visit the Dutch and, bringing sake and domesticated ducks as gifts, asked to try Western-style food. Luncheon was prepared, and they ate together – the Dutch at a table and the Japanese on the *tatami* – and the priests smacked their lips with obvious delight over the food and wine. The Hollanders were again asked to bring their eating utensils to the palace where they ate in full view of the Japanese officials on 5 April.

On the visit to Edo of 1730, Kyudayu asked the Dutch to provide the shogun with butter, Spanish wine, anise, cinnamon extract and a dish of sweets.

Art

Yoshimune, who himself dabbled as a painter and seemed to be interested in Western-style oil painting, in 1722 asked the Dutch for some paintings from Europe. In 1726 the Hollanders brought to Edo five paintings including a floral still-life by Willem Frederik von

Royen (1654-1723), a painter of the Hague School specializing in flowers, fruits and birds, and rector of the Prussian Academy of Fine Arts in Berlin.

Miscellaneous

On certain occasions during the rule of Yoshimune the Dutch were requested to dance and sing, to duel, to eat with chopsticks, to write on paper, to disrobe, etc. In 1721, they were asked about construction methods and fire-extinguishing techniques; in 1726, they were questioned on how to make glass and how to dye printed cloth. Finally these wide-ranging interrogations were curbed by the officials, and the Dutch were permitted to answer in writing. The subject matter was extremely broad: Dutch history, the government of the seven provinces, armaments, currency, overseas trade and reasons for it, relations with China, murder, incendiarism, penalties for robbery, the seasons, the new year, holidays, agriculture, relations between landlord and peasant, shops, wages, slaves, places producing diamonds, places producing various textiles, dying cotton prints, surnames, churches, priests, funeral rites – every variety of information about Dutch, i.e. Western government, customs and society.

From the above can be seen how wide Yoshimune's interest in the West was. Yet, as far as can be determined, he made no serious attempt actually to utilize much of the miscellaneous information which was acquired from the Hollanders at his behest, nor did he show any inclination to deviate from the Tokugawa norm in the light of information from the West. Since Yoshimune's apparent major concern was to try to bring the Bakufu government back to the spirit of its founder Ieyasu, Yoshimune's orientation was one of realism and pragmatism. It was in this context that his interest in Western learning developed. In accordance with Japanese traditions Yoshimune paid proper reverence to the imperial house and revived the *Daijoe* (Great Thanksgiving Ceremony after the Enthronement); he respected national customs, encouraged *kokugaku* (national studies)²² and turned his energies to governing the country efficiently according to the Confucian concept of a righteous ruler. Thus, Yoshimune intended by adopting a few selected Western techniques simply to give additional strength to what he understood to be an already well-functioning system.

According to the *Togukawa jikki* (Historical record of the Tokugawa (up to the tenth shogun)):

One who studies half-heartedly is not fit to govern. For a Nagasaki *bugyo* and the like it is wrong to respect only things which are Chinese. Particularly among people who read books there are many who like China, and it is said that they have a tendency to lose sight of the [Japanese] national polity. The reason [Yoshimune] had many medicinal plants obtained and had many foreign plants and seeds raised was so that the sick of Japan could be treated even if foreign ships did not come.²³

Since medical techniques are naturally most important to the saving of human life, Yoshimune had Western-style medicine investigated further; since astronomy and the calendar were of vital import to his programme of increased agricultural production, he encouraged the attempt to correct the calendar by more accurate measurement of eclipses and of the movements of heavenly bodies. His interest in timepieces was clearly related to this latter concern. Better breeds of horses, horsemanship, the importation of various weapons, the method of manufacture of various textiles – he realized the necessity for all these. He had the government, economy, products and customs of the Netherlands examined for the reference of the ruling officials. Although there were among these interests those that perhaps simply arose from a desire to enjoy the rare and the different, the great majority were pragmatic in nature.

The intriguing combination of Yoshimune's quasi-scientific interest in, for example, Western astronomy and his rather naive curiosity about Western personal habits are indicative both of the limitations of the *Weltanschauung* of Yoshimune individually and of the Japanese generally in their approach to information from the West. In Yoshimune's case his image of himself was 'completely bound to the traditional Chinese idea of the ruler's responsibility to provide the people with the exact time indications fundamental to agriculture'.²⁴ And if in this regard, Western practical knowledge or, for that matter, practical knowledge from anywhere else was useful, it should be obtained and utilized. However, no serious thought was given to the intellectual premises of the culture which had produced that practical knowledge. Thus, the seeming disparity of levels of inquiry to the Dutch as between, for example, on the one hand, the calculation of eclipses and, on the other hand, how the Hollanders urinated seemingly did not occur to the Japanese inquisitors.

Yoshimune, by taking the lead in relaxing the Kan'ei Edict and

thus providing a certain imprimatur and even stimulus for the study of the West, also set the standard of Bakufu control of Western learning for the next century and a third. Accordingly, he specified the areas of inquiry which Japanese scholars might investigate and the pace at which these might be studied. The principal Japanese effort in *Rangaku*, therefore, was to be in the two most immediately practical fields of study, namely astronomy and medicine. Relevantly applicable subfields within these two general categories followed, e.g. physics, geography, botany and pharmacology. However, the theoretical foundations of Western physical and natural sciences were to be either ignored, misunderstood or to suffer from a cultural lag of as much as a century. Moreover, even if the bases of that Western culture which had generated these practical techniques were even minimally investigated, they would be judged to be either lacking in 'humanity' or to be 'disruptive' in the context of traditional East Asian harmony.

Nevertheless, what may be termed the 'Yoshimune plateau' of Western studies in Japan was not alone a Japanese phenomenon. The Dutch were in Japan for commercial reasons and for no other. Thus, for the most part their interest in acting as cultural intermediaries was practically non-existent, and they tended to view the Japanese quest for information from them as an annoyance that would have to be endured in order to preserve their unique trading privileges. Dealing with what was to them a peculiar people under very peculiar circumstances was problem enough without compounding their difficulties by some undoubtedly superficial attempt to 'Westernize' the Japanese who might, if better informed about the West, either eject the Dutch entirely or choose to deal with other Western countries thus breaking the Dutch commercial monopoly.

Further, the Dutch who came to Japan were hardly trained scientists and were no more able to respond to scientific inquiries abroad than they would have been at home. Engelbert Kaempfer, K. P. Thunberg and Philip Franz von Siebold have all had justifiable attention for their remarkable scientific contributions while in Japan. However, the total time they spent in Japan was about 7 years out of a total of some 211 years that the Dutch were confined to Deshima. None of the three was a Dutchman, and, in fact, they all came to Japan after the peak of Dutch scientific achievement in the seventeenth century had been passed. Thus, the overwhelming proportion of Japanese contact with Hollanders was with the average employees of

the Dutch East India Company, and this surely placed implicit limits on the nature and scope of Dutch studies.

Nor did the East India Company seek to involve itself other than for strictly commercial gain in the sale of Dutch books despite the often apparent interest of the Japanese in acquiring them. Whatever Western books did reach Japan either arrived by pure chance (for example, in the possession of Dutchmen who were probably using them for their own study purposes on the long sea voyages or during the days and nights of isolation on *Deshima*) or were brought by individual *Hollanders* who had heard via the grapevine that the private sale of books was a profitable enterprise. Only in the late eighteenth century did the East India Company, responding to orders from the *Bakufu* for specific books, most of which were re-orders for additional copies of Dutch books already in the possession of the Japanese, begin to include books as a regular part of their annual trading cargo.

In addition, by the time of Yoshimune's interest in information from the West, Dutch was the single Western language medium known in Japan, and thus whatever publications were obtained from the West had to be in Dutch. Therefore, indirectly the Japanese were entirely dependent on the subject matter and speed of publication of Dutch translations of European books from Latin, English, French, German, and the like. For the Japanese, then, not only was there no systematic acquisition of knowledge from the West during the Tokugawa Period but that knowledge which did reach Japan was filtered so many times and in so many arbitrary ways that the effect of this on Japanese scholars needs to be taken into consideration.

Thus, while Yoshimune's deeds and attitudes gave a new latitude to the study of the West in Japan, the obvious limitations on this seemingly beneficent development must be understood. As significant as *Bakufu* patronage of Dutch studies was, its greatest significance was probably its reinforcement of *Bakufu* control. There was certainly no lessening of the Tokugawa commitment to *Chu Hsi* Neo-Confucianism as its basic philosophy. Although Western techniques and skills were now to be studied for their potential utilitarian value, if such value were found, especially under official auspices, it was to be seen in its narrowest sense as supplementary to a completely satisfactory and immutable value system.

VIII

Aoki Kon'yo and Noro Genjo

One of the important results of Yoshimune's interest in Western techniques was the gradual emergence of Edo as a new focus of Dutch studies. Prior activities had, of course, been concentrated in Nagasaki and had been practically monopolized by the interpreters. But with the shogun himself evidencing interest in knowledge gleaned from the West, scholars in the employ of the Bakufu, in particular, began to respond to official stimulus. Of special significance in this regard were the scholarly efforts of Aoki Kon'yo and of Noro Genjo.

Kon'yo was the only son of a commission agent for fish at Nihonbashi, Edo. After studying for two years at Kyoto under Ito Togai, son of Ito Jinsai, and becoming steeped in *kogaku*, Kon'yo moved back to Edo in 1722 and opened a small Confucian school. In his writings Kon'yo showed particular concern for the food problem in Japan and noted the frequent deaths from starvation of those for whom there was an insufficiency of the so-called five cereals; rice, barley and wheat, millet, sorghum and beans. His proposed remedy for this can be seen from the following statement attributed to him: 'People that live far from the towns or on the islands are sometimes struck by famine. The only way of fighting against this is by planting potatoes.'¹

It was in direct response to an especially disastrous famine that in 1734 Kon'yo wrote *Kanshoki* (Record of the sweet potato) and in 1735 *Banshoko* (Treatise on the sweet potato) which was brought to the attention of Shogun Yoshimune by the Edo *machibugyo*. The sweet potato was not entirely unknown in Japan since it had been introduced from the Ryukyu Islands around 1612, but it achieved new significance through the writings of Kon'yo who came to be called popularly 'Master Sweet Potato' (Kansho sensei). The sweet potato was again discussed by Kon'yo in 1738 in *Soro zatsudan* (Miscellaneous talks in a grass hut), a work in which Kon'yo set forth his ideas of food production, economics, administration, finance and currency.

Coincidentally and in line with his other endeavours of the same kind, Yoshimune had a variety of potato plants cultivated in the

experimental garden plots inside the Edo castle grounds and later had them transplanted throughout the country. Accordingly, Yoshimune, having been greatly impressed by Kon'yo's scholarly attributes and desiring to have Kon'yo work for him as a researcher, gave Kon'yo his first official appointment in 1739 as *Orusui shihai* (assistant to the keepers of Edo Castle)² with the title of *shomotsukata* (librarian). In 1744 Kon'yo was appointed *Momijiyama hi no ban* (fire guard of Momijiyama), and in 1747 he became an official Confucianist attached to the Hyojosho (Consulations Office) directly under the *roju*. Aoki's last promotion came at the age of 70 in 1767 to the post of *shomotsu bugyo* (magistrate of documents).

Having had a long-standing curiosity about foreign things, especially foreign writing, prior to receiving his official appointment, in 1740 Kon'yo requested permission from the Bakufu to speak directly to the *opperhoofd* on the next Dutch visit to Edo. Yoshimune raised no objection, and from 1740 to 1758 Kon'yo (who was called 'Awoki Boenzoo' by the Dutch) became a familiar figure at the annual interrogations of the Hollanders at Edo. For Kon'yo the principal rationale for contact with the Dutch was to try to apply himself to the study of the Dutch language. In fact, the brevity of these meetings with the Dutch made it almost impossible to use these encounters for serious study. Thus, whatever Dutch Kon'yo did acquire was learned almost entirely from the interpreters who came from Nagasaki in the Dutch entourage.

Although the nature of both his linguistic accomplishments and of his knowledge of Holland itself was clearly rudimentary, as is evident from his writings, nevertheless the extent of Kon'yo's achievement, lacking any written materials such as dictionaries or grammar books and without any formal instruction, is impressive. Such later eighteenth-century pioneers of Dutch studies as Otsuki Gentaku and Sugita Gempaku wrote that Kon'yo had been to Nagasaki to study Dutch, but more recent research has convincingly demonstrated that he never made such a trip. Undoubtedly Gentaku and Gempaku, recognizing the difficulty of learning Dutch, could not believe, based on their examination of Kon'yo's books, that he could have attained the level of language competence he did without travelling to Nagasaki.

In fact, Kon'yo's Dutch was rather elementary, and his knowledge of the West generally as, for example, in his *Kon'yo manroku* (Random notes of Kon'yo) (1763) was rather naive and sketchy. Nevertheless,

confined as he was at Edo to brief, unstructured interludes with the Dutch themselves and with the interpreters, it seems remarkable that he could encompass the amount of information which is evident in his varied writings. Though none of his work was actually published, most of it circulated in manuscript among interested scholars. Three instances of his compilation of things Dutch are: *Oranda kanshuka yaku* (Translation of Dutch drinking songs) (1745); *Oranda oboku ikkakusetsu* (Description of the Dutch cherry tree and of the narwhal) (1746); and *Oranda kaheiko* (Treatise on Dutch currency) (1742) which included information on Dutch gold, silver and copper coins as well as on Dutch weights and measures.

While Kon'yo's writings on the Dutch language are not at all systematized and include random notes on the Roman alphabet, Dutch pronunciation, lists of nouns, adjectives, verbs and adverbs and simple examples of translation from Dutch to Japanese, they were an important step forward from the prior lack of any language learning materials. Three of his books contain the core of his linguistic contribution: *Oranda wayaku* (Translations from the Dutch language) (1743); *Oranda moji ryakko* (Brief consideration of Dutch writing) (1746); and *Oranda bunyaku* (Translation of Dutch words) (1749). An example from *Oranda wayaku* both typifies the kind of approach found in Kon'yo's work and exemplifies the level of his knowledge of Dutch:

Gister was het mooy weer maar vandaag achtig regen.
Gisteru wasu hette mooi ueeru niaru handaaku akuteki ueeru.
 (in katakana)

'Gisteru' is yesterday. 'Wasu hette' is an auxiliary having the feeling of the Japanese 'ta'. 'Mooi ueeru' is good weather. 'Niaru' is an auxiliary, here having the feeling of the Japanese 'shikaredome'. 'Handaaku' is today. 'Reegen' is rain. 'Reegen akuteki ueeru' is 'the weather looks like rain'. This sentence means: 'Yesterday was fine weather, but today looks like rain'.³

Despite what may seem to be the rather unsophisticated nature of Aoki's language competence, he made a signal contribution to stimulating further interest in the Dutch language and to securing more information from Holland. Perhaps the most important encouragement given by Kon'yo to subsequent scholars was that he worked at Edo as an official of the Bakufu and did his studying and writing under the aegis of the shogun himself.

Since Kon'yo depended so heavily on the Nagasaki interpreters, it

is important to note three with whom he may have had contact: Motoki Nidayu (Ryoi) (1695–1749), son of Motoki Shodayu (Eikyu) (1628–97) who was the translator of the first work in Japan on Western pathology, *Oranda zenku naigai bungozu* (Dutch chart of the internal and external components of the whole body) (1696, unpublished);⁴ Nishi Zenzaburo (1718–68); and Yoshio Kosaku (Kogyu) (1724–1800) (called 'Josiwo' or 'Iosiwo' by the Dutch).

Zenzaburo, as a result of his being a member of the Nishi family of hereditary interpreters, went to Deshima to begin his study of Dutch in 1722. He passed successively through the various ranks becoming a major interpreter in 1754 and accompanied the annual Dutch missions to Edo six times. His primary contribution to the development of Dutch learning was his epoch-making *Rannichi jisho hensan* (Compilation of a Dutch–Japanese lexicon) which was completed only through the letter 'B' at Zenzaburo's death. However, his work based on Pierre (Pieter) Marin's *Woordenboek der Nederduitsche Fransche taalen, Dictionnaire Flamand et Francais* (Amsterdam and Utrecht, 1729) was continued by other scholars some thirty years later and ultimately became a most significant aid to nineteenth-century Japanese scholars of Western studies.

An idea of the commitment of Zenzaburo to this work is evident from an entry in the Deshima *Dagregister* of 13 July 1767, the year before Zenzaburo's death:

The senior interpreter Zenzaburo has not appeared on the island since 1 March, and according to all reports has not come out of his house and pretends to be sick and too old to continue in the interpreter corps. However, all his colleagues are unanimous when they speak to me of Zenzaburo that he is feigning illness and that what he is really doing is making a Dutch–Japanese dictionary and that they believe that Zenzaburo shall seek a discharge from his duties since he had enough money on which to live.⁵

It is interesting to note here the use of a Dutch–French, French–Dutch dictionary. The first efforts of the Japanese in obtaining Western books were directed at whatever the Dutch factory was provided with or an individual Dutchman had in his possession, or at ordering works identical with those they found at Deshima. That this may well account for the use of the Marin book may be seen from the deep interest of many Hollanders in the French language, and thus on the desks of the members of the factory there may have been French dictionaries.

Yoshio Kosaku was a brilliant member of a Nagasaki interpreter family. At the age of 13 he achieved the rank of *kotsuji* and at 24 became an *otsuji*. During his long life which extended from the time of Yoshimune down through the flowering of Dutch studies he served nine different times as *nembanotsuji* and about 1790 was appointed *tsujimetsuke*. At the age of 69 he was imprisoned for five years for neglecting to forward to the Bakufu certain translated petitions from the Dutch *opperhoofd*. When he was released after serving his sentence in full, he was ordered to resume the teaching of Western learning, but three years later he was dead.

Kosaku was an excellent Dutch-language scholar, had a distinct scientific aptitude, and did research in astronomy, geography, botany and particularly medicine. He was also an outstanding teacher and by his death had shared his knowledge with over 600 disciples.⁶ Kosaku was the best-known and the most accomplished disciple of the Swedish physician Karl Peter Thunberg whose lectures Kosaku carefully noted down and compiled in *Thunberg kuden* (Thunberg's lectures).

As a result of his close contact with many of the visiting Dutch physicians at Deshima and on trips to Edo with them, Kosaku established a school of medical science called the *Yoshioryu* (Yoshio-style), similar in stature to the earlier *Nishiryu*, *Narabayashiryu*, etc., and he wrote many treatises on medical subjects. Among these latter were: *In'eki hatsubi* (Analysis of urine)⁷ (published in 1815), *Ramposho* (Book on Dutch prescriptions), *Oranda yoka no sho* (Book on Dutch treatment of carbuncles), *Komojinryu koyakusho narabini neriho* (Explanation of Dutch-style ointments and their preparation), *Komoryu suiyaku hiden* (The secrets of Dutch-style proprietary medicines), *Komo yuyaku no sho* (Book of Dutch-style ointments), *Komoryu koyakuho* (Techniques of Dutch-style ointments), and *Furenki baidokuron* (Essay on syphilis of Joseph Jakob von Plenck (1738–1807)).⁸ Yoshio Kosaku's teaching included such subjects as Written Dutch, Spoken Dutch, Bandages, Methods for Diagnosing the Abdomen, Methods of Taking Medicine, Methods for Healing Carbuncles and Bonesetting.⁹ Kosaku's *Komo hijiki* (Record of Dutch secrets) was based on the chapter entitled 'Mercurius Water' in Plenck's *Materia chirurgica*.¹⁰ Two more of his works were *Oranda eizokureki wage* (Japanese translation of the Dutch perpetual calendar) and his translation written in 1795 of Lorenz Lange's account of his trip to Peking in 1715, *Roshi Pekin kiko* (Journey of the Russian Ambassador to Peking).

In the writings of Kosaku some idea of the high regard in which he held the Dutch may be seen from the following idealized picture of Dutch life:

They [the Hollanders] get up early in the morning, wash their hands and faces, and worship first heaven, then the king of the country, and then their parents. They emphasize filial piety. Since the founding of that country there had been no case of the killing of a lord. A hundred years ago for the first time there was such a case. Murder, immoral conduct, unbelieving, and obscenity are prohibited. These are the same as the first five Buddhist prohibitions except for drinking intoxicating beverages. Marriage customs: the parents discuss the marriage with a go-between; after their decision, they report it to an official; the official calls in the boy and girl and asks them if this accords with their desires, if there is any regret, and if there is anyone else in their hearts; he asks the parents, brothers, remote relatives, and neighbouring villagers if there is any regret; he records the marriage in a register, and the couple is wed. Generally there is no divorce; when there is, the household property is divided in half. Widows, widowers, and orphans are collected in one place and cared for there. Food and drink are supplied by the state. Each one engages in his own trade and sells his wares to acquire expense money. The children learn whatever trade interests them, and thus from olden times many famous men have gone out from here. Holland has procreation as the mainstay of its economy. They believe in devils and gods. Therefore on encountering misfortune, by way of securing their wishes, they pray to heaven to grant compassion and benevolence. If the calamity can be avoided, they take a vow to offer thanks either by dividing their household property in half or by giving ten gold pieces, 100 gold pieces, or some other thing; this is recorded in a book; the book is placed in a box; they wait for the calamity to be avoided; then when the calamity is over, they give the box to an official; the official takes it, reports this to heaven, and distributes the promised items among the poor of the country saying heaven gives this to you.¹¹

This quotation is here offered at length because despite its somewhat naive nature, it may well reveal important facets of the developing spirit surrounding the spread of Dutch learning. One notes immediately the highly idealized picture of Holland where life is so serene and so socially advanced – an apparent comparison with the social unrest and disorganization which plagued the middle and late Tokugawa Period. The emphasis on filial piety seems to be an attempt to draw a parallel with Confucianism and thus justify the importation of Dutch studies in the light of the prevailing philosophy of the Bakufu. Again the interspersing of the supposed parallel of Dutch and Buddhist moral principles is perhaps based on the hope of attracting to the side of the Dutch scholars the support of the vigorously anti-Christian and thus anti-Western Buddhists. The detailed

representation of what Kosaku said were the Dutch marriage and divorce customs probably represent a strong implied criticism of traditional Japanese marriage customs and of the frequency of divorce and the ease with which it was obtained together with the lack of provision for the divorcée in Japan. The mention of the care given widows, widowers, and orphans may be considered as a further indication of a modest social consciousness which was perhaps concurrent with the rise of Dutch studies. The same thing seems true of the reference Kosaku makes to the donations to the poor. Perhaps as important as any of his observations is the idea that in Holland children may study whatever interests them and that as a result of this the Netherlands has produced many great minds. This might be considered to be an implicit plea for the youths of Japan to go beyond the hereditary professions of their families and to increase the body of knowledge, i.e. to study the Dutch language and Western culture and thus enlighten a backward Japan. It is not remiss therefore to stress the importance of such progressive views since Yoshio Kosaku's life-span extended through the last three-quarters of the eighteenth century during which his writings and teachings inspired most of the leading *Rangaku* scholars.¹²

Noro Genjo whose knowledge of the West was also encouraged by Yoshimune was born in Hatase in Ise and at the age of 20 went to Kyoto where he spent ten years studying Confucianism, medicine and botany. It is interesting to note that one of Genjo's teachers was Namikawa Temmin (1679–1718) who was a disciple of Ito Jinsai and a follower of the *kogaku* school. Temmin's influence on an important scholar of the West like Genjo is, of course, difficult to determine. However, it is well worth mentioning since Temmin as a disciple of Jinsai went beyond the standard speculations of the orthodox Chu Hsi school and was a keen and critical observer of the economic, political and social structure of his time.

In 1720, Genjo was taken into the service of the shogun and was sent into the field to collect medicinal plants. In 1739, he took his place at Edo as *omemieishi* (physician who could practise in the inner Bakufu court) and in 1747 was made *yorai oishi* (physician without a practice) with a stipend of 200 *hyo*. As a result of his annual contacts between 1741 and 1750 with the Nagasaki interpreters and with the Dutch physicians, Genjo seems to have acquired a fair knowledge of the Dutch language. Of particular assistance to him were Yoshio Kosaku and two physicians from Deshima, Philip Pieter Musculus who was in

Edo every year from 1741 through 1747 and Doedo Evertsz who came to the Bakufu capital in 1748 and again in 1750. Genjo's research culminated in two important translations: the twelve-volume *Oranda honzo wage* (Explanation in Japanese of Dutch botany) (1749–50) based on the work of Dodonaeus and *Oranda kinjuchugyozu wage* (Explanation in Japanese of pictures of Dutch birds, beasts, insects and fish) (1760) taken from the book by Johnston. In this volume Genjo included a list of animal names in parallel columns in Dutch, Latin and Japanese.

Thus with the work of Aoki Bunzo and Noro Genjo under the aegis of Shogun Yoshimune, Western learning in Japan entered a new and important phase in its development. Of far more significance than the various writings of the two scholars which have been detailed above was the firm stamp of respectability which was thus given to Dutch studies. For no longer was it possible for antagonists merely to dismiss the study of the West as 'barbarian studies' and unworthy of scholarly inquiry since two distinguished and properly Confucian-trained scholars had with the encouragement of the shogun devoted themselves to this endeavour.

IX

The kohoka, Maeno Ryotaku and Sugita Gempaku

Having traced the rise of Dutch learning from its inception among the interpreters at Nagasaki, through the intellectual ferment of the Genroku and Shotoku Periods, and into its next stage of Bakufu sponsorship under Shogun Yoshimune, chronologically the middle of the eighteenth century has been reached. This chapter and the next will attempt to reflect something of the remarkable progress of Western-influenced techniques and technology in the latter half of the eighteenth century. During this period two principal lines of development can be discerned: medicine-botany and astronomy-calendrical science. Some mention has already been made of the interpreter-inspired medical advances such as the *Kasuparu-ryu*, *Nishi-ryu* and *Yoshio-ryu*. However, these were predominantly local Nagasaki schools of medical technique, and it was not until the study of European medicine at Edo that serious scholarly interest in Western scientific methods was assured.

In Japan the medical tradition followed that of China. From its introduction into Japan via Korea in the fifth century AD, Chinese medicine practically overwhelmed indigenous folk medicine based on charms and amulets, simple medications derived from natural sources and hot-spring baths. Henceforward, *Kampo igaku* (Chinese medicine) with its own texts and its own highly developed systems of diagnosis and treatment completely dominated medical practice in Japan.

The theory of *Kampo* was closely interwoven with the Confucian view of a harmonious universe and involved the maintenance of 'harmony' in a healthy body. Moreover, bodily harmony was related to the ideal of the perfect balance of *yin* and *yang*, to the five elements – wood, water, earth, fire, metal – and to a special conception called *gozo roppu*, comprising five viscera (liver, lungs, heart, kidneys and spleen) and six entrails (stomach, large intestine, small intestine, gall bladder, bladder and 'heating organ' – *sansho*, or thorax, upper abdomen and lower abdomen). Chinese medicine also propounded correspondences between human attributes and the external natural

order, e.g. man's 4 limbs and the 4 seasons; man's 12 joints and the 12 months; 360 bones in the human body and 360 degrees in a circle.

Both diagnosis and therapy in *Kampo* as practised in Japan were based upon so-called triads. In diagnosis the three components were (1) feeling the pulses of both wrists, (2) observation of the tongue and (3) evaluating the general attitude of the patient. Treatment included (1) medicines from the very extensive pharmacopoeia of Chinese materia medica, (2) acupuncture and (3) moxibustion. Medical education in Japan was also supposed to follow the Chinese pattern with prescribed courses of study and required reading including Chinese medical texts, the Confucian Classic of Filial Piety and *The Analects of Confucius*.

However, the Japanese physicians were not nearly as rigorous as their Chinese counterparts either in pursuing a specified and detailed course of study or in enforcing an examination system which permitted only thoroughly qualified physicians to practise medicine. Rather the profession of physician in Japan became a hereditary one which usually required no particular qualifications other than the ability to administer moxa or acupuncture and to prescribe remedies generally based on a combination of folk medicaments with cosmological 'insights'. There was, of course, no licensing system for doctors, and literally any Japanese who wished to be a physician could and often did simply open a practice and announce himself as a doctor. Nevertheless, respect for the role of the physician in society had been strong in the Chinese Confucian tradition and a similar respect accrued in Japan. Chinese Buddhism also had its 'medical' heroes as well as a lore of physician-missionaries who had achieved miraculous cures thus facilitating further popular reverence for the physician in Japan. It should also be noted that physicians had the possibility of earning a fairly substantial income as their repute spread among potential patients or as they received patronage from important officials or members of the warrior elite.

Moreover, since medicine was most directly related to human life, there was comparative freedom in its study, thus providing an easier avenue for the admission of European ideas. Throughout the Tokugawa Period doctors enjoyed

greater intellectual freedom than was permitted in almost any other branch of learning. . . . By exploiting the opportunity of reading either in the original Dutch or in the few translations that were made of Western scientific works, an intellectually curious doctor could acquire a more liberal education than

was normally possible for other Japanese. Travel was heavily restricted in feudal times, but here again, if armed by a letter from his feudal lord, a doctor serving the clan might travel to distant cities on plea of study or consultation. The doctor of Tokugawa times . . . was the intellectual of that society.¹

At the end of the Ashikaga Period (1338–1573)² Manase Dosan (1506–94) from Kyoto became the leading proponent of the so-called *Rishu* school of medicine. The *Rishu* school which developed in Ming China took the position that diseases had a variety of causes, not simply an imbalance in bodily harmony as had been held by traditional *Kampo*. Dosan himself established the practice of observing urine as a principal means of diagnosis. His advocacy of the *Rishu* school was supported by some 800 pupils who spread his teachings throughout Japan as the *Dosanryu* (Dosan-style). However, at the same time as the *kogaku* school of Confucianists was achieving its greatest success, the physician Nagoya Gen'i (1638–96) appeared at Kyoto and in opposition to the *Dosanryu* called for a return to the earliest fundamental Chinese medical treatises and precepts. Gen'i and his coterie, paralleling the *kogaku* group, took the name *kohoka* (ancient-style group). Accordingly, the *kohoka* advocated a return to the very early Chinese practice of treating illness by purging, sweating and vomiting. Paradoxically, however, they began a trend in Japanese medicine which was ultimately to give rise to the experimental method based on clinical experience. The *kohoka* included such advocates as Goto Konzan (Yunokuma Kyuan) (1659–1733), Yamawaki Naonori (Toyo) (1705–62), Nagatomi Dokushoan (Hosuke) (1732–66) and Yoshimasu Todo (1702–73).

Konzan was from Edo and went to Kyoto to study. However, having convinced himself that if he were to become a Confucian philosopher he could not compete with Ito Jinsai and if he were to become a priest he could not approach the wisdom of the Zen monk Ingen (1592–1673), Konzan turned to medicine.³ He rejected what he believed to be the coarseness and emptiness of the *Kingenryu* (Chin-Yuan-style) saying that the cause of every kind of illness lay in the stopping and stagnating of certain *ki* (Chinese: *ch'i*)⁴ and that the proper treatment was to create free movement of these *ki* (*junkisetsu*, circulation of *ki*); Konzan's therapy relied mainly on hot spring baths, bear liver, moxa and red pepper.

Yamawaki Toyo, a disciple of Konzan, and a member of the *koho* group, perhaps influenced by the Nishi, Kurisaki or Narabayashi schools in medicine, in accord with the spirit of the times founded a

positivist theory of medical practice based on the simple principle of the observation of facts. That this perhaps occurred as an outgrowth of the introduction of European learning may be surmised from the fact that the essence of Western medicine was, of course, experiment and investigation. Toyō, then an official physician at Kyoto, questioned the explanation of internal organs contained in Chinese books and together with Kosugi Genteki (1730–91), from the Obama fief in Wakasa and private physician to the Kyoto *shoshidai* Sakai Tadamochi (1725–75), on 7 February 1754 supervised the first post mortem known in Japan.⁵ The dissection took place inside the Jidoin temple north of Nijo Palace. The corpse was of a 38-year-old man called Kauemon who had been executed after being condemned to death.⁶ As a result of this dissection Toyō published *Zoshi* (Description of the organs) (1759) which though it included crude anatomical charts did not measure up to Western anatomical treatises. The *Kampo* physicians reacted with vehemence to the defilement of the human body evident to them in the autopsy which had resulted in *Zoshi*. Wrote one of them: ‘Dead organs have no function; the shape of organs is unimportant; only the living spirit is important.’⁷ Despite such fulminations, *Zoshi* marked the true beginning of experimental medicine some fourteen years before the publication of *Kaitai shinsho* (New book for understanding the human body) in 1774.⁸

Yoshimasu Todo from Hiroshima, a man of erudition and insight, was to the Japanese medical world what Ogyū Sorai had been to the Confucian philosophers. In 1738, Todo went to Kyoto where at first he was not recognized by the public, and he made his livelihood by selling dolls and other handicrafts. But with the guidance and assistance of Yamawaki Toyō he quickly achieved renown. Todo said that 10,000 illnesses spring from a single poison and that by knowing the source of the poison one could effect a treatment by the counteraction of the original poison. This may be loosely compared to present-day homeopathy. Todo called his school *Ichidokuka* (One-poison school). With a countervailing poison he attacked and sought to drive out the poison already present in the body; life and death are not given by medicine, he said, but disease can properly be cured by medicine. His theories swept Japan; for example, it is said that his book *Ruijuho* (Various collected prescriptions) (1764) sold 10,000 copies before it was in print one month.⁹

Yoshimasu Todo’s son Nangai inherited his father’s ideas and

carried them even further. Nangai formulated the proposition

that a vital spirit and the uninterrupted circulation of blood and water in the system are essential to a perfect state of health, and that any alteration in the condition of this spirit, or of the circulation of the fluids, as, for instance, their retardation or acceleration, constitutes disease. . . From this doctrine the school became known as the school of the vital spirit, blood, and water.¹⁰

The essential concept was set down by Nangai in a book entitled *Kikkessuiyakucho* (Therapeutic qualities of the vital spirit, blood and water).

The *kohoka* necessarily rejected the theories of Sung, Chin, Yuan and Ming physicians, and its advocacy of a return to original concepts had the same basis as the *kogaku* of Sorai and Jinsai. The spread of empiricism as typified by the *kohoka* was marked by a spirit of independence not found in Chinese medical practice; by means of an attack on existing dogma and by working on the basis of experimentation the emergence of a spirit of direct investigation in Japan was evident, perhaps for the first time.

Continuing this trend among the physicians, Yamawaki Toyo's son Gento (1736–82) and his grandson Tokai (1757–1834) later performed dissections in the presence of many Chinese-style doctors.¹¹ In 1762, Nagatomi Hosuke from Osaka, a pupil of Yamawaki Toyo and a practitioner of the *kohoka*, went to Nagasaki and, as did all medical men at that time, not only consulted the Chinese physician in residence but went to Yoshio Kosaku and studied various Western medical techniques. Hosuke respected dissection and praised the surgical removal of breast cancers.

Ogino Motoyoshi (Taishu) (1737–1806), a pupil of Yamawaki Harusue and a government surgeon, was a phlebotomist who had contact with Thunberg and other Dutch physicians. In 1770, he wrote *Shirakuhen* (Essay on phlebotomy). In the same year, on 25 April, Ogino assisted Kawaguchi Nobuto (1736–1811), Dutch-style physician to the Furukawa *han*, when Kawaguchi dissected the headless corpses of two executed criminals and the decapitated head of one of them. Subsequently, in 1772, Ogino composed *Kaishihen* (Essay on understanding a corpse). However, these efforts had a relatively small impact on Japanese medical practice which continued to be grounded in Chinese medical theory.

Hanaoka Zuiken (Seishu) (1760–1835) was an authority on surgical operations and an outstanding expert in such diseases as cancer and

elephantiasis as well as ailments of the bladder, the anus, etc. It is said that his and his pupils' surgical operations were often more skilled and more effective than those of the Dutch-style physicians.¹² In addition, Seishu not only developed and successfully utilized techniques of narcotherapy, but he also performed the first surgical operation under total anaesthesia, making use of jimsonweed even before the initial anaesthesia in the West using ether. But the so-called Hanaoka-style did not evolve entirely from the Chinese-style of medicine. For it seems that Yamato Kenritsu (1749–1827) who taught surgery to Hanaoka Zuiken was the son of a disciple of Irako Dogyu (see chapter V above), an adherent of the *Kasuparu-ryu*. The writings and instruments of Irako Mitsuaki, grandson of Dogyu and author of *Geka kummo zui* (Collection of diagrams for beginning surgery) (1767), are still available for study, and if one examines them, it is clear that the surgery of Hanaoka came from that practised by the various Nagasaki families.¹³ This, therefore, was an era (after approximately 1750) when the Japanese had gone beyond the confines of Chinese medicine and realizing its inadequacies turned to experiments of their own and eventually to the knowledge and techniques of the West. Nevertheless, even though some of these *kohoka* physicians either had access to Dutch medical books or owned some themselves, they were unable to profit from them because of their ignorance of the Dutch language.

Maeno Ryotaku (1723–1803) was born in the residence of the Okudaira family at Edo Teppozu. He was a short, undignified-appearing man who took up the study of medicine in the *kohoka* tradition of Yoshimasu Todo and became the official physician to Okudaira Masanari (1694–1746), Tango no kami (lord of Tango). Ryotaku later served in the same capacity under Okudaira Masaatsu (1724–58) and Okudaira Masaka (1744–80) at Nakatsu in Buzen. Ryotaku first began the study of *Rangaku* under Aoki Kon'yo at the secret behest of Masaatsu. In 1770, by order of Masaka, Ryotaku made a trip to Nagasaki where he pursued his studies diligently under the tutelage of Nishi Zenzaburo, Yoshio Kosaku and members of the Narabayashi family. That these studies were very seriously regarded by his feudal master may be understood from the fact that when Ryotaku was trying to read Dutch books, he shut himself in his house and was not in attendance on his lord. Some of his colleagues complained to Masaka about this, but the daimyo replied that Ryotaku was studying the things of Holland and thus was entrusted with a necessary task and was following a path equivalent to loyal

attendance.¹⁴ For the purposes of this volume Ryotaku typifies the encyclopedic activities of the Japanese physician who as a student of Dutch learning was able to range widely over the various sciences and to present his findings to the public through his many publications. By means of such research Ryotaku was able to apply in a new way the tradition of the physician labouring disinterestedly in the service of mankind.

Among Ryotaku's writings were the following: *Oranda yakubun-ryaku* (Brief translations from the Dutch) (1749–57), *Oranda yakusen* (Compendium of rules for the translation of Dutch) (1785), *Jogo sanko* (Consideration of particles and auxiliary verbs), *Oranda jigaku shosei* (A small measure of the study of Dutch writing), *Rango zuihitsu* (Occasional notes on the Dutch language),¹⁵ *Suiseiko* (Treatise on comets), *Yochizuhen* (Compilation of a world atlas)¹⁶ (1782), *Kamusatsukaki* (Record of Kamchatka) (1789), *Kamusatsukashi* (History of Kamchatka) (1791), *Roshia homgiryaku* (Short history of Russia) and *Roshia daito ryakki* (Short record of the Russian imperial line) (both 1793). Ryotaku's book *Oranda chikujosho* (Book on Dutch fortifications) (1790) was ordered copied by the daimyo of Odawara, Okubo Tadazane (1781–1837), who placed it in his private library.¹⁷ In 1777, two works of Ryotaku, *Honyaku undoho* (Translated work on the laws of motion) and *Sokuyoki zusetsu* (Illustrated explanation of the orbits of the moon and the planets), are believed to be the first translations on the physical sciences in Japan.¹⁸ The former is in accordance with the laws of 'Isaka' (Sir Isaac Newton, 1642–1727) while the latter was a model also according to Newton of the five planets and the comets showing how their surfaces receive light from the sun.

Perhaps the one book which best indicates the extent of Ryotaku's knowledge of the West as obtained from Holland was *Jingen shisetsu* (Private explanation of benevolent words). This was an oral translation of Ryotaku noted down by Tairo Sanjin who was probably Ishikawa Tairo (1766–1817), a painter of the European school at Edo. While *Jingen shisetsu* was ostensibly a language book, it exemplified in its contents the emerging scope of *Rangaku* by including a collection of the precepts of Western philosophers as well as information on the Dutch language, on Dutch books, on Dutch medical science and other natural sciences and on a variety of social and political problems.

A similar and perhaps more important work for understanding Ryotaku's private opinions was *Kanrei higen* (Secret words on narrow

views) (1777). The sarcasm in the title was directed at the *Weltanschauung* of the Japanese who, as Ryotaku viewed them, were little children trying to measure the sea in a calabash and to comprehend the heavens by peeping through a tube. According to Ryotaku, it would be of benefit to the Japanese to be more familiar with the West, which had produced the kinds of advanced technique evident in its medical science. In particular, Ryotaku advocated that Christianity be liberated from its onus of 'evil teachings' and that a dichotomy be made between the Christian religion and the advanced technology of the West. He argued that while Buddhism was limited to 20 per cent of Asia and Confucianism to 10 per cent of Asia, Roman Catholicism had spread over many continents, Protestantism was the religion of Holland and Judaism had even spread to Africa. By means of such logic and by pointing out that Catholicism, Protestantism and Judaism held in common as their basic tenet assisting the poor and the afflicted, Ryotaku was both attempting to cast doubt on the verity of Chinese teachings and to diminish the negative characterization of Christianity. Moreover, in what might be considered an indirect criticism of Japan's governmental system, he wrote that in Europe the Pope, kings and other high officials were all elected to their posts.

Thus not only was Ryotaku a true pioneer of the development of Western medicine in Japan, but he must be seen as a scholar who, on the basis of the kinds of knowledge he was acquiring through the technology of the West, raised questions about the character of the society which had produced that technology. For his many contributions to the foundations of Edo *Rangaku*, Ryotaku was given the posthumous name *Ranka* (Incarnation of Holland).¹⁹

Sugita Gempaku, like Kosugi Genteki who had participated with Yamawaki Toyo in the 1754 dissection, was from the Obama domain. Gempaku was the grandson of Sugita Saisen, a pupil of Nishi Gempo's son Muneharu, and the son of the surgeon Sugita Hosen (1692–1769). Gempaku was well grounded in *Kampo* and had also studied at Edo under another member of the Nishi family, Gentetsu (1681–1760) who had written *Kinso tetsuboku ryōji no sho* (Treatment of web-footedness and of syphilis) (1735), derived from the writings of Paré. Gempaku also received instruction from Yoshio Kosaku and together with Maeno Ryotaku and Nakagawa Jun'an (1739–86), an Obama samurai who had studied Dutch in Nagasaki, closely questioned the Hollanders on their annual visits to Edo. Gempaku wrote *Yoka taisei*

(Handbook of surgery) and in 1805, as a reward for his medical achievements, Gempaku was received in audience by the eleventh Shogun Ienari (1773–1841).

Perhaps the outstanding achievement of Sugita Gempaku was the famous autopsy performed by himself and Maeno Ryotaku together with Nakagawa Jun'an. On the night of 3 March 1771, it was reported in a letter from a man called Tokuno Mambei, a retainer of one of the Edo *machibugyo*, that the corpse of a convicted criminal would be in Senju Kotsugahara at the execution grounds the following day. The corpse which the three *Rangakusha* were permitted to view was that of Aochababa ('old lady green tea'), a woman of about 50 from Kyoto. Both Ryotaku and Gempaku had with them copies which they had purchased individually of the 1734 Dutch translation (*Ontleedkundige tafelen*) by Gerard Dicten, a practitioner at Leiden, of the *Anatomische tabellen* (*Tabulae anatomicae in quibus corporis humani*)²⁰ (1722) by Johan Adam Kulmus (1689–1745) of Breslau who studied medicine in Halle, Leipzig, Strasbourg, Basel, and with Boerhaave at Leiden and was a teacher of medicine and pathology at Danzig. In accord with the experimental spirit of the times Gempaku and Ryotaku compared the anatomy of the woman's body with the charts of Kulmus, and they were amazed and impressed with the accuracy of the Western work in contrast to traditional Chinese teachings. Realizing the import of their discovery Gempaku, Ryotaku and Jun'an agreed to translate Kulmus's book. With the help of other scholars of Dutch learning, after three years and five months' work they eventually published the fruit of their labours as *Kaitai shinsho*.

In the preface to *Kaitai shinsho*, in addition to Kulmus nine other authors are mentioned from whose work illustrations, essential to any anatomy book, had been taken. The list of authors is impressive not only because these were the leading anatomists in Europe of that time but because listing their books as sources of the plates means that somehow all these books were known in Japan. The writings of Paré have already been mentioned. In addition, the works of Gerardus Blasius (Gerard Blaes) (1625–92)²¹ and Volcher Coiter (Koyter) (1534–1590),²² Dutch anatomists, Thomas Bartholin (Bartolyn) (1616–80),²³ a Danish anatomist, Jan Palfijn (1650–1730),²⁴ a Belgian anatomist and surgeon, and Johann Vesling (Joan Veslinguis) (1598–1649),²⁵ a German anatomist and professor at Padua, were identified. While he was not mentioned by name, evidence in the plates themselves seems to support the view that the work of Juan Valverde de

Hamusco, a Spanish physician who introduced the work of Vesalius into Spain, was also included.²⁶

Sugita Gempaku in his *Rangaku kotohajime* has described in great detail the difficulties in the creation of this book as well as its significance as a landmark in the introduction of Western science into Japan. However, its importance was perhaps not so great as Gempaku would have liked to believe, for as has been discussed above, dissections had already been performed by disciples of the *koho* style of medicine, and progress in language study and Dutch-style medicine had already been made by the interpreters at Nagasaki. Yet *Kaitai shinsho* did mark the first time that the correctness of the European anatomical concepts of Vesalius (1514–64) had been proved to the Japanese public through the printed word.

Despite the breakthrough which it definitely represented, *Kaitai shinsho* had a number of weaknesses. Maeno Ryotaku was the only one of the translators who knew a fair amount of Dutch, and there were no dictionaries available. The original by Kulmus had a brief text and extensive footnotes, but the Japanese version omitted the footnotes entirely. Since the Japanese physicians who worked on the translation had not learned Western medicine in any systematic way and since they were still viewing the Kulmus volume as supplementary to their basic grounding in Chinese-style medicine, the translation has inaccuracies due to the translators' lack of understanding of several of the basic concepts prevailing among Western medical practitioners. Also, the illustrations were reproduced as woodcuts thus diminishing their clarity and precision when compared with the original.

Nevertheless, these negative observations pale into insignificance when juxtaposed to the remarkable impact which *Kaitai shinsho* had on the Japanese scholarly world. This undertaking, being a co-operative scholarly venture among already recognized prominent physicians, gave it a particular distinction which, in turn, meant that other similarly qualified physicians became interested in medical knowledge from the West. Clearly, too, the reliance of the translators of Kulmus on demonstrable proof of the correctness of his anatomical charts laid the groundwork for scientific medicine and subsequently for a more scientific attitude among a significant segment of the growing Japanese intelligentsia. Accordingly, the appearance of *Kaitai shinsho* marked the opening of a new era in the history of *Rangaku* in which the physical centre of Dutch studies moved from Nagasaki to Edo, and the intellectual mainstream broadened from the

frequently part-time and often dilettantish scholarship of the official interpreters to the national scholarly community, with prestigious physicians at Edo in the vanguard.

Perhaps the greatest importance for the future development of Dutch studies was the foresight of the translators in securing the sanction of the Bakufu for the publication of their work. This was accomplished by presenting *Kaitai shinsho* to the authorities for their approval prior to its actual public release. While this act obviously reinforced shogunal control of *Rangaku*, it also provided an implicit signal that the government was ready to permit further scholarly activity in order to enhance medical knowledge.

Nevertheless, in the long run the involvement of the Bakufu in setting the parameters of intellectual inquiry created a dilemma for both the shogunate and the *Rangakusha*. On the one hand, the scholars were never quite sure what it would and would not be permissible to investigate and therefore tended to impose a kind of cautious self-limitation on the subject matters they chose to study. On the other hand, while the shogunate greatly desired additional technological information from the West, it was constantly uneasy lest any part of that information or any combination of parts provoke fundamental questions about the Tokugawa system itself.

In addition to Maeno Ryotaku, Sugita Gempaku and Nakagawa Jun'an a number of other scholars participated in the arduous and lengthy work of translating *Ontleedkundige tafelen*. One of these was Katsuragawa Hoshu (Getchi) (1751–1809) who as official physician to the Bakufu inherited the medical skills of the Katsuragawa family and also as a proponent of Dutch learning became proficient in language studies and in world topography. It was through his efforts, after meeting Thunberg at Edo in 1776, that the study of Western surgery received official recognition when, in 1793, that subject was added to the curriculum of the Igakkan (Official Medical School),²⁷ and Hoshu was appointed as instructor. Hoshu was also a pioneer in the use of the microscope as is demonstrated in his *Kembikyo yoho* (Methods of using the microscope) (1802). He also wrote *Kaijo biyoho* (Essentials of preparation for seafaring) (1809), the first Japanese work on shipboard hygiene.

Among Hoshu's other writings were *Shinsei chikyu bankoku zusetsu* (Explanatory diagram of a newly constructed world) (1786), *Hon-yaku chikyu zenzu* (Translation of a map of the world) (1791) and *Roshiashi* (Record of Russia) (1793). At this time the increasing

activities of the Russians in the islands in the far north were arousing the interest of the Japanese scholarly world,²⁸ and, when the Russians returned three Japanese castaways who had travelled throughout Russia, Hoshu was ordered by the Bakufu to question the returnees on the institutions and customs of that country. In the autumn of 1794 he published a report on this interrogation entitled *Hokusa bunryaku* (Brief report on the castaways in the north) to which was appended *Roshia ryakki* (Short description of Russia), a translation of a book given to Hoshu in 1794 by the *opperfhoofd* Gijsbert Hemmij (at Deshima from 1 November 1792 to 20 November 1797).

Hoshu's importance to the publication of *Kaitai shinsho* cannot be underestimated, for it was through his efforts as an official of the Bakufu that this work was given the government's sanction. The anxiety on the part of the authors about their book was based on the fate of *Orandabanashi (Komodan)* (Tales of Holland) (1765) by Goto Rishun (1697–1771) which had been banned by the shogunate at publication simply because of the reproduction of the Dutch alphabet in cursive, Latin and gothic scripts.²⁹ However, in the case of *Kaitai shinsho*, through Katsuragawa Hoshu copies were presented to the shogun, to the Kujo family who were the *kampaku* (highest official of the Imperial Court at Kyoto) of that time, to members of the Konoe and Hirohashi families (both descendants of the Fujiwara),³⁰ and to each *roju*. Since no obstacles occurred, the book was freely circulated and, concurrent with its acceptance, the actual term *Rangaku* came into general usage throughout Japan.

Other leading participants in the translation of Kulmus's anatomy included Mine Shuntai, physician to the Takasaki family,³¹ who later translated *Practijk der medicine* by Buyzen; Karasuyama Shoen, physician to the Sakai daimyo at Shonai (Tsuruoka); and Kiriya Shotetsu, physician at the castle town of Hirosaki. The illustrations for the *Kaitai shinsho* were done by Odano Naotake (1749–80). Naotake was an Akita samurai who was the first pupil to learn Western-style painting from the famed Hiraga Gennai (1723–79). The skill Naotake acquired in delineating the principles of shading and of lightness and darkness was evident in his twenty-one plates for the epoch-making work.

Certainly the ground-breaking research of Maeno Ryotaku and Sugita Gempaku resulted in the widening of the influence of Dutch learning throughout Japan.³² Moreover, given the position which the physician occupied in the Tokugawa system and the ideas which had

already entered Japanese medical thought at that time through the teachings of the *kohoka*, it is not surprising that the medical profession by the end of the eighteenth century was perhaps the strongest voice raised on behalf of the new natural science.

X

The advent of heliocentricity

At the beginning of the previous chapter it was stated that Western science in Japan followed two main lines of development: medical-botanical and astronomical-calendrical. Since the latter had a deep relationship with agricultural production and with transportation, it became one of the primary concerns of the Dutch scholars.¹ Reference has already been made to the encouragement given to this field by the practical-minded Yoshimune. However, the study of European astronomy came into direct conflict with the views of both Confucianism and Buddhism, and therefore was extremely controversial.

Without attempting to expound in detail the complexities of traditional East Asian cosmogony, it is perhaps advisable to explain briefly something of the character of the Sinic view of the universe which prevented easy acceptance of European astronomical science. That which caused the most concern in the minds of Eastern scholars was a feeling that somehow the Westerners were tampering with the 'laws' of the heavens and by so doing would surely create serious disharmony. The gravity of this situation can perhaps be understood better when one realizes that 'Chinese thought had a materialistic outlook, regarding the sky merely as something which differs from earth and accepting among its components the stars whose influence, it was thought, makes for harmony or discord in the affairs of earth. To the Chinese mind man had to find a formula for individual and social behaviour in harmony with heaven.'² The apparent inviolability of the natural world in Chinese thought then predominant in Japan is stated as follows by Derk Bodde:

In China, the sage traditionally has been one who adjusts himself to the universe as he finds it and thus gains what he considers true happiness: contentment in simplicity. [This] explains, also, why the Chinese, though they developed remarkably scientific techniques in the compilation of dictionaries, histories, encyclopedias, and other scholarly works, failed to apply these techniques to the world of nature and thus failed to create a physical science.³

Such a point of view cannot be over-emphasized, particularly in the

context of this study, since it did not envisage the direct observation of nature and was therefore the antithesis of natural science from the West.

This concept of the universe as a harmonious system was equally basic to the philosophy of Chu Hsi which was the official ideology of the Bakufu. In the Neo-Confucian view of the cosmos as a moral order and even a social order, the European investigative technique could only be viewed with grave suspicion since, 'Centrality is the order of the universe, and harmony is its unalterable law'.⁴ Further, an essential aspect of this cosmology was the premise of *Tenen chihoron* (the theory that heaven is round and earth is square). The incompatibility of such ideas with European astronomical studies can be clearly seen from the following quotations from an 'orthodox' Japanese Neo-Confucianist.

The Universe is one Ki. Divided it is the In and Yo, Heaven, Earth, the Five Elements,^[5] and all things, sun, moon, hills, streams, seas, men, birds, brutes, grasses, trees, insects, fishes. Though these all differ yet are they from the one Ki. Its ethereal pure part revolving above is called Heaven, its heavy, impure part, stationary below is called the Earth.

Astronomy observes the movements of the heavenly bodies and makes calendars. It has its uses, but is only of the appearances. As we know its use, as it too comes from the heart which reverences Heaven, it should not be pursued carelessly. The Sages made calendars to strengthen the state, for the farmer works according to the times of Heaven and if he miss the seasons his labour is in vain. Beyond this need the Sages felt no interest in the mere movements of the heavenly bodies.

Northern lights, comets and shooting stars, are ordinary things, and not the reproofs of Heaven to the Westerns, who will not stand in awe of them. They think Heaven a dead thing not connected with these portents, and thus the Way of the Sages and man's obedient heart are both destroyed. And some of our scholars are deceived, admitting errors and parables in the sacred books; are filled with doubts and accept the new learning. Most pitiful! Most detestable!⁶

One can conceptualize accordingly the inherent threat which Western astronomy posed to the prevalent Japanese cosmological precepts.

Concurrent with the advances in medical science among the interpreters and their disciples at Nagasaki in the latter half of the seventeenth century, there was similar progress in the field of astronomy. However, in this latter realm opposition to the new developments was far stronger since they impinged even more directly upon basic tenets of the official orthodox philosophy. The Neo-Confucianism of the Tokugawa government did reject the

Buddhist otherworldliness which had been the prevailing ideology of former eras. But Neo-Confucianism was concerned with ethical standards which were tied to ancient Chinese heaven worship; its principal mission lay in politics and in ethics and in the perpetuation of traditional Confucian cosmology. Thus, Neo-Confucian scholarship was certainly not 'scientific' in the Western sense, and the view of science and of the universe which evolved under its influence was obviously different from that developing in contemporary Europe.

Nevertheless, as information from Europe filtered into Japan, certain of the post-Renaissance Western astronomical innovations became known, and, as will be described, some of them were ultimately adopted by the Japanese in order to attain specific, immediate, practical goals. However, the 'use' of nature was the intent of the Japanese, not the 'understanding' of nature. Thus, the era of *Rangaku* in astronomy was, like its counterpart in medicine, an era of supplementing unquestioningly accepted Chinese theories. Accordingly, the applied astronomy that did develop in eighteenth- and nineteenth-century Japan, especially that which had official sponsorship, did not raise fundamental questions about the nature of the universe itself.

The idea that the world was round had apparently preceded the advent of the Dutch in Japan and had gained an audience during the 'Christian Century'. Aoki Kon'yo wrote in *Konyo mampitsu* (Random notes of Kon'yo):

In Japan the story that the world was round must have begun in *Chukoku byodan* (Tales copied from China). *Chukoku byodan*, according to the edition of 1720, was related by Sogetsu, a travelling Buddhist priest from Suo who stayed in China from 1511 to 1513, and was taken down by Kiyohara Kijo and, according to the preface, was discovered in a folding screen which decayed in her house. In the contents of this book is an illustrated explanation of a globe and a 'celestial sphere'. On the earth appear such unusual distinctions as back, breast, stomach, waist, and soft and hard as well as a crude map which shows Japan, China, India, Konron (Kunlun, a mountain range in China), a country of pygmies, a country of giants, and one great continent in the extreme south. Since the fabled 'Islands of Gold and Silver'^[7] also appear on this global map and since the rumour of their existence was not current until around 1582, there is reason to doubt that this map was of so early an origin. Perhaps the *Chugoku byodan* itself was a later fake.⁸

In the sixteenth century the coming of the Europeans to the Far East had begun. In 1516 the Portuguese sent an embassy to China. In 1519 the Magellan party reached Asia on their voyage round the

world, and it is reasonable to assume that at that time reports of Western European globalism had reached the Orient.

In a letter of 1552, St Francis Xavier (1506–52) wrote:

The Japanese have the characteristic of being better versed in reason than other peoples. However, even if one prizes their learning, there is as yet no one who knows of the shape of the earth and its movement; therefore when we explained the reason why [the earth is round] and the source of wind, thunder, etc., they came with enthusiasm to hear these truths. The sophisticated scholars especially respect us, and rejoice in hearing the mysteries of this explanation. We gained the perception of our religion in the hearts of the general public by the convenience of various scholarly skills.⁹

A number of the Japanese intelligentsia in the second half of the sixteenth century became Christian converts as a result of sermons of the missionaries on astronomy, geography, meteorology and mathematics. Many other Japanese, while not converting to the new religion, came eagerly to hear the learned discourses of the Jesuit fathers and to see globes and charts of the heavens. The Italian priest Carlo Spinola (1564–1622) who was at Kyoto from 1605 to 1612 excelled in mathematics and astronomy and gathering together local scholars organized a sort of academy of science. About the same time there was a small observatory at Osaka, and at Nagasaki longitude and latitude were being computed. Meanwhile the global theory became rather widespread. The Imperial Palace asked for a globe; Oda Nobunaga and Toyotomi Hideyoshi saw globes and heard explanations of them; Toyotomi Hideyori (1593–1615)¹⁰ also evinced great interest in globalism.

The Christian global theory that had come into Japan was of course Ptolemaic and thus not yet heliocentric. Copernicus (1473–1543) had died just six years before Xavier came to Japan, and he had first advocated heliocentricity in only 1530, and therefore the theories of the priests, while Western, were not Copernican. But they seemed more precise than traditional East Asian theories and could attract the interest if not always the credence of the Japanese.

However, being in sympathy with the Bakufu anti-Christian policy both before and after the isolation edict was put into effect, the Confucian scholars conducted attacks on so-called *bangaku* (barbarian learning). In 1606, Hayashi Razan (Doshun)¹¹ (1583–1657) together with Matsunaga Teitoku (1571–1653) wrote an essay called *Hai Yaso* (Against Jesus). This was an argument with the converted Japanese Fukansai Fabian (Sakuma Soto) (1565–1631) in which Hayashi and

Matsunaga vigorously attacked the global theory which Fabian had propounded in one of his writings. They wrote that to say that the world was round was in error and did not correspond to the teachings of Chu Hsi.¹² These attacks persisted, and in 1630, the Kan'ei Edict, as has been stated, outlawed all Chinese books pertaining to Western learning. Thus not only the political philosophy of the Bakufu opposed European scholarship, but Confucianists as well as Buddhists who were anti-Christian opposed it.

While Confucian and Buddhist theorists were attempting to ridicule the supposed shortcomings of Western science, more European ideas slowly emerged on to the Japanese scholarly scene. In 1656, a book entitled *Kenkon bensetsu* (Explanation of heaven and earth) appeared. This was a verbatim transcription with interpolations by Mukai Gensho, read aloud to and recorded by Nishi Kichibei, the elder, of a translation in Romaji by Sawano Chuan of an astronomy book brought to Japan by the apostate priest Giuseppe Chiara (Okamoto Sanuemon) (1601–84).¹³ *Kenkon bensetsu* explained the movements of the sun, moon, stars, tides, weather, etc., according to Aristotelian theory. However, in his comments Gensho, a Confucianist like Razan, severely criticized 'barbarian' scholarship, saying that the West speaks only of the form of the atmosphere but fails to consider the reasons for that form. His opposition to the global theory was not against its conclusion, but he stated that the Occidental process of demonstration was unnecessary since Confucian learning reached the same answer by intuition. Thus, as a committed Confucian, what interested Gensho was the total *Weltanschauung*, including man and society as well as nature. Yet despite Gensho's Confucian orthodoxy and his lack of astronomical expertise, his very admission that the world was round was an important advance over Hayashi Razan.¹⁴

Kobayashi Kentei (Yoshinobu) (1601–83), an interpreter and follower of Sawano Chuan, was imprisoned by the Tokugawa in 1646 on suspicion of being a Christian. But after 21 years' incarceration, in 1667, he was pardoned by the Nagasaki *bugyo*.¹⁵ After Kentei's release he became a teacher of mathematics and astronomy and wrote *Nigi ryakusetsu* (Theory of terrestrial and celestial globes) (1667)¹⁶ apparently based principally on *De sphaera* (c.1593) by the Spanish priest Pedro Gomez (1535–1600), who had prepared such material especially for teaching it to Japanese students.¹⁷ *Nigi ryakusetsu* followed the same pattern as *Kenkon bensetsu* but contained more

astronomy and less astrology. Further, *Nigi ryakusetsu* contained none of the references to Christianity which are integral to *De sphaera*. Kentei explained systematically according to European astronomical theory the roundness of the earth, but he reiterated the *Tenen chihoron*. Kentei also gained some renown as a teacher, and in 1683 his repute was greatly enhanced by his being able to correct an error in the computation of an eclipse of the sun as recorded in the official calendar.

Both *Nigi ryakusetsu* and *Kenkon bensetsu* essentially continued the Japanese astronomical tradition in the Chinese mode with only minor infusions of knowledge from the West. Moreover, neither volume was ever printed, nor even in manuscript was either circulated widely. The recentness and severity of the Bakufu's anti-Christian policy surely had a restraining influence on the distribution of such works. In addition, the language barrier continued to be a principal obstacle to the acquisition of up-to-date and accurate Western science. Perhaps most importantly the continuing overweening predominance of orthodox Chu Hsi Neo-Confucianism among Tokugawa intellectuals and officials, in particular, meant that writings such as *Kenkon bensetsu* and *Nigi ryakusetsu*, which were not entirely in the traditional mould, were by definition suspect and remained in relative obscurity.

Around the turn of the eighteenth century, there seems to have been some added interest given to the study of astronomy in Japan by the introduction of certain instruments imported from Holland. These included: *shokozu* (drawings of ascending and descending celestial bodies (for knowledge of the four seasons)) *chikyuzu* (world globes), *karuta* (navigational charts), *rashin* (compass), *jimeisho* (time pieces), *seishaku* (sextants), *seigankyo* (telescopes) and *isutarai* (sun dials).¹⁸ Possibly with the help of such information as the scholars obtained from these devices Baba Nobutake (Oda Genko) produced works like *Shogaku tenmon shinan* (Instruction in beginning the study of astronomy) (1706) and *Tenmon zusetsu* (Illustrated astronomical diagrams) (1713). These books gained a great contemporary reputation particularly because of their explanation of solar eclipses which in Japan as elsewhere in the world had been a subject for much superstition.

A contemporary of Baba's was Nishikawa Joken (1648–1724) who, though not an interpreter, while living in Nagasaki became acquainted with Western learning through Chinese translations especially in mathematics, astronomy and geography. As the author

of over twenty books on varying topics which were published by Kyoto and Osaka bookshops, he was probably the first popularizer in Japan of European scholarship. One of Joken's teachers who was at Nagasaki from 1572 to 1680 was the Confucian scholar Nambu Soju (d. 1688) whose knowledge of astronomy was based primarily on Chinese writings, but to which he added information obtained from the '*juban*' (barbarians).¹⁹ What must be particularly noted is that Soju distinguished between the study of the form and the atmosphere of the heavens on the one hand and the study of the fate and reason for heaven on the other. He made his astronomy the study of the form and the atmosphere. He did not negate the 'five forces' theory, but he separated natural scientific astronomy from the study of divination. With regard to the question of whether the sages too mentioned the theory of the earth's being round, Soju wrote, 'The explanations of the Chinese sages is the bad habit of detailed non-scholarship . . . the Chinese sages discussed this among themselves, and the barbarians were not the first to transmit this',²⁰ thus displaying his defence of Confucianism.

Joken followed the teachings of Soju closely. Since Joken's writings were eclectic and drew on a great variety of sources and since he himself did not engage in astronomical observations, he can not be described as an original thinker. Nevertheless, Joken was the first Japanese astronomical thinker to dichotomize between *meiri* heaven and *keiki* heaven, between a moral heaven and a physical heaven, between a limitless ideal heaven and a measurable real heaven. Thus, while he philosophically condemned the 'redhairs' for their evil ways, and for lacking proper respect for *meiri*, he recognized their accomplishments in *keiki* astronomy and especially in terrestrial geography and navigation. Probably Joken was the first Japanese to allude to the spirit-matter dichotomy between East and West, a rubric under which, even to the present, certain Japanese sought to preserve intact so-called Eastern values while at the same time accepting, of necessity, Western techniques.

The major astronomical treatises of Joken were *Tenmon giron* (Discussion of astronomy) (1712); *Ryogishusetsu* (An explanation of collected materials on celestial and terrestrial globes) (1714); and *Tenmon seiyo* (Detailed outline of astronomy). Joken also produced several geographical works, the first of which was *Kaitsushoko* (Treatise on commercial relations with China and with the barbarians) (1695; revised and enlarged 1708). This volume was an extended

version of *Shokoku dosansho* (Book of products of various countries) (1669) whose first half was by the Chinese interpreter Egawa Tozaimon and whose last half was by the aforementioned Dutch interpreter Nishi Kichibei.²¹ Though the original was made up of fragments collected by the interpreters in the performance of their duties, Joken's version included a map of the world and a discussion of the geography and products of each known country of Asia, Africa and Europe.

Some of Joken's other writings included *Ryoiki ninzuko* (Treatise on the population of both spheres) (1712); *Nagasaki yawagusa* (Twilight tales of Nagasaki) (1720) which contained a glowing description of Holland; *Nihon suidoko* (Treatise on Japanese geography) (1720) which discussed the advantages and disadvantages of Japan's geographical characteristics compared to those of other countries and concluded that Japan's were superior;²² and *Shijunkikoku jimbutsu zusetsu* (Illustrated description of the peoples of forty-two countries) (1720) culled from both Chinese and Dutch sources with illustrations from the latter and encompassing 22 countries in Asia, 10 countries in Europe (Turkey, Muscovy, Hungary, Poland, Italy, Germany, France, Holland, England, Denmark), 4 countries in Africa (Kabyle-country, Beretania, Ethiopia, Africa), 4 countries in America (Brazil, Chile, Costa Rica, Canada) and the land of the Samoyeds and Patagonia.²³ Probably the crowning glory in a life devoted to study came to Joken in 1718, when he was called to Edo to advise Tokugawa Yoshimune on important astronomical problems.²⁴

As has already been described in the discussion of Yoshimune's interest in Western astronomy, the calendar was the focus of that interest. Accordingly, as the study of astronomy became more commonplace in eighteenth-century Japan, its major concern continued to be the practical application of astronomical data and techniques to improving the official calendar. From ancient times both the calendar and astronomy had been monopolized by two hereditary families at the imperial court at Kyoto, namely the Tsuchimikado and the Abe, and by the Tokugawa Period their endeavours had largely stultified into astrology. There had been no reform in the calendar in over 800 years since the adoption of the *Semmyoreki* in 861.

In 1684 Yasui Santetsu (1639–1715), 'a person of low class',²⁵ and an exceptionally brilliant mathematician, after several years of his own efforts and despite opposition from the Kyoto court astronomers, persuaded the Bakufu to accept his 'corrected' *Jokyo* calendar. Since

all previous calendars had simply been copied from Chinese models, this was the first calendar devised independently by a Japanese. Nevertheless, Santetsu's reform was minimal, still based entirely on Chinese theory with only minor corrections for Japanese longitude and latitude. As Nakayama suggests, it was not only Santetsu's theoretical antagonism to Western calendrical science which caused him to ignore it but probably even more his lack of adequate information about it.²⁶

As a reward for his *Jokyo* reform, Santetsu was named in 1684 as the first official astronomer to the Bakufu, *tenmonkata*, by Shogun Tsunayoshi and was given rank and stipend equivalent to that of a samurai received in audience. The official duty of the *tenmonkata* was to devise an annual calendar, but a façade of authority over calendrical matters was retained by the Kyoto court astronomers who were entitled to review the drafts prepared by the *tenmonkata* and who each year continued officially to promulgate the calendar for the coming year.

In 1689 Santetsu had an observatory built on his own grounds at Edo, Surugadai, where he occupied himself with observation of the heavens. Santetsu changed his family name to Shibukawa and took the given name Harumi. Subsequently, the Shibukawa family continued for twelve generations to serve the shogunate as *tenmonkata*.²⁷

The eulogy of Shibukawa Harumi written by one of his pupils points up the importance of his contribution to Tokugawa astronomy:

Owing to his studies on astronomy he occupied the first place among the astronomers of his time. Since Shibukawa founded his observatory, chronology corresponds with the movements of the celestial bodies. Down the ages the eclipses alternate. His study on the eclipse contains exact conclusions. . . . He established the correct orbits of the 5 planets. He wrote many books which were all good.²⁸

That Harumi accepted the Western view that the earth was round can be understood from his unpublished *Tenmon keito* (System of astronomy) (1698). In fact, as early as 1691 he had presented to the Ise shrine a globe which he himself constructed.²⁹ However, as a Neo-Confucian ideologue Harumi was a consistent critic of most of the Western astronomical concepts with which he had contact. His traditional world-view seems to have been minimally affected by ideas from the West, although once again this was in some measure the result of his limited access to information from the West.³⁰

In line with Shogun Yoshimune's calendar reform, in 1754 the

tenmonkata Yamaji Yazaemon (1704–72), who was a competent mathematician fully acquainted with Chinese calendrical calculations, together with Nishikawa Chujiro (Seikyu), who had been appointed a *tenmonkata* in 1747, carried out the *Horeki* reform.³¹ Although Seikyu's participation in this undertaking in part reflected his special knowledge of many of the books on astronomy written originally in Chinese by such Jesuit missionaries to China as Matteo Ricci, Adam Schall (1591–1666) and Ferdinand Verbiest (1623–88), the essential methods used were still derived from traditional Chinese astronomy, and the *Horeki* calendar was little different from the *Jokyo*. Also, as in the case of the *Jokyo* calendar, the *Horeki* reform was diminished in importance by the lack of Western materials available to the *tenmonkata*, by their limited competence to deal with those Western materials which they did have and by their relatively unsophisticated techniques of celestial observation.

Only nine years after its promulgation, the *Horeki* calendar proved to be inaccurate by its failure to forecast a solar eclipse in October 1763. However, Sasaki Bunjiro (Yoshida Hidenaga), who was appointed *tenmonkata* in 1764, established an observatory at Ushigome on Waradana Hill in Edo the following year.³² Accordingly, in 1769 a revised *Horeki* calendar was proclaimed by the Bakufu. At Bunjiro's request, in 1782 the observatory was moved to a better location for observation at Asakusa Katamachi which today bears the name Tenmonhara. Here it was that the Bakufu astronomical studies were conducted for the remainder of the Tokugawa Period, and it was this observatory which became the centre of officially sponsored Dutch studies during the first half of the nineteenth century.

Just as the translation of *Kaitai shinsho* marked the breakthrough in medicine for Dutch studies in Japan, in astronomical progress the key event was to be the emergence into the Japanese scientific consciousness of the heliocentric theory, the knowledge of and eventually the acceptance of the views of Copernicus. That this intellectual process, in the light of the dominant Neo-Confucian cosmology, was more painful for the Japanese than the growing acceptance of Western pathology and of Western pharmacopoeia is apparent. Also, as in the case of medical knowledge, techniques were once again more acceptable than theory. Therefore, the Bakufu, recognizing the utilitarian value of Western methods of meteorological observation but persisting in its intent to enforce parameters on and maintain control over

knowledge coming from the West, established its firm supremacy in this area by giving direct employment to most of the 'experts' who showed either promise or prowess in astronomy.

Unlike the physicians, the Japanese astronomical community had almost no contact whatever with knowledgeable Westerners but had to rely almost exclusively on books, either Chinese or Dutch. Both the Dutch at Nagasaki and the missions to Edo were regularly questioned on astronomical matters, but practically without exception the results were unsatisfactory to their Japanese inquisitors. Hendrik Doeff, *opperhoofd* from 14 November 1803 to 6 December 1817, in recording one of his sessions with several Japanese scholars reveals both the kinds of questions the Dutch were being asked and what must have been the mutual frustration of both sides as a result of their exchange:

The Bakufu astronomers, naturalists, and several doctors came to visit. . . . I, in the place of the *opperhoofd*, even in somewhat difficult questions endeavoured to answer them, and even in fields with which I was unfamiliar I tried to satisfy their desire for information. The various points of study were several problems from the standpoint of barometers, thermometers, watches, compasses, the measuring of degrees on the sea, the movement of the sun, moon and stars, and other physical and mathematical problems. I could satisfy them a bit by referring to two or three books I had with me.³³

Given these difficulties in intercultural communication, it is understandable that there was for the Japanese a significant time-lag in their being exposed to such basic Western scientific theories as that of heliocentricity. Apparently throughout the seventeenth century and during most of the eighteenth century, rumours of the possibility of heliocentricity had seeped into Japan. For example, at the time of the appearance of *Kenkon bensetsu* Sawano Chuan had written, 'Although the earth does not ascend and descend, there is a story that the heavens do not move and that the earth rotates by itself.'³⁴ This theory was answered in the same volume by such statements as 'However, since it rotates quickly, should not dwelling places collapse and disintegrate?' and 'The explanation that the earth does not move is a good one; it is detailed; moreover it is explained by means of the theory of negative and positive characteristics;^[35] . . . the heavens move continuously; the earth is still and continues in its natural state.'³⁶ Nishikawa Joken too heard stories of heliocentricity, but during his lifetime a two-volume work which recorded the heliocentric theory, *Rekishokosei kohen* (The make-up of astronomy) (1742), abstracted from Chinese sources by Shinohara Yoshitomi, had not yet appeared. Nor was there

any mention of heliocentricity in *Komo tenchi nizu zeisetsu* (Detailed explanation of two Dutch maps) (1738) by Nishi Zenzaburo's brilliant pupil Kitajima Kenshin. This work, using two maps brought from Holland, one of the earth and one of the heavens, was primarily a transliteration of the names of places on earth and of heavenly bodies and gave no attention to theories of astronomical movement.³⁷ In short, heliocentricity was practically unknown in Japan up to the appearance of the translations of Motoki Ryoei (1735–94) in the last decades of the eighteenth century. The impact of Ryoei's work on Japanese astronomy may, therefore, be compared to that of Maeno Ryotaku and Sugita Gempaku on Japanese medicine.

It was a century and a half after the condemnation of Galileo that this third-generation Nagasaki interpreter introduced Japan to the name of Copernicus. Ryoei, also known as Nidayu, Einoshin or Ranko, began his career as an apprentice interpreter in 1748 and some forty years later reached the rank of *otsuji*, having made the Edo *hofreis* with the Dutch three times. Being ordered by the authorities to translate whatever Dutch books were available on the subjects of astronomy, geography, navigation and the calendar, his remarkable ability was assiduously applied to a veritable flood of translations. Though his work was not published in his lifetime, the originals and manuscript copies circulated widely among government officials and intellectuals. Nevertheless, these volumes remained for the most part almost entirely unknown to the public at large in Japan.

Three of Ryoei's translations are of special significance. In 1772 he drafted *Oranda chikyu setsu* (Dutch treatise on the earth) which was followed by the extended version *Oranda chikyu zusetsu* (Dutch illustrated treatise on the earth) in 1773. Both were based on the Dutch translation *Atlas van zeevaart en koophandel door de geheele weerdelt* (1745) of Louis Renard's *Atlas de la navigation et du commerce* (1715). As the title indicates, this volume was a basic guide for seamen including a selection of maps and instructions on how to use them. Of particular interest to Ryoei were additional 'scientific remarks' on astronomy written into the Dutch edition by Reinier and Iosua Ottens, famed Amsterdam mapmakers, and by Jan van den Bosch Melchiorisz, a specialist in the French language. Ryoei included their comments in his translation, and thus *Oranda chikyu zusetsu* became the first Japanese work to refer to Copernican heliocentrism³⁸ and to reproduce the name Copernicus in katakana.³⁹

In 1774 Ryoei completed *Tenchi nikyu yoho* (Method of using

celestial and terrestrial globes), based on *Tweevoudigh onderwijs van de hemelsche en aardsche globen* (Amsterdam, 1666 printing) by the renowned cartographer Willem Janszoon Blaeu (1571–1638). Blaeu, an eminent figure in the golden age of Dutch science, was a disciple of the Danish astronomer Tycho Brahe (1564–1601) and an eager advocate of Copernicus's views. Nevertheless, Ryoei's translation was only partial and cannot be considered a full exposition of the Copernican system. Whether because of difficulty in understanding Blaeu's original or because of caution in the face of the predominance of Bakufu-supported Neo-Confucian cosmology, Ryoei again did little more than mention Copernicus by name.

The third and most important of Ryoei's major works was *Seijutsu hongen taiyo kyuri ryokai shinsei tenchi nikyu yohoki* (The foundation of astronomy, newly edited and illustrated; on the use of celestial and terrestrial globes according to the heliocentric system) (1793) based on the 1770 Dutch translation of *Describing and explaining the construction and use of new celestial and terrestrial globes* (1766) by the English astronomer, mathematician and maker of globes George Adams, senior (d. 1773). For this treatise Ryoei also drew on other Dutch sources, in particular *Philosophische onderwijzer* and *Beginnelsen der natuurkunde*. The former was the Dutch version of *The Philosophical Grammar* (first edition, 1735; Dutch edition, 1744) by the English popularizer of science Benjamin Martin (1704–82). The latter was *Anfangsgründe der Physik* (Leipzig, 1753; Dutch edition, 1768) by Johann Heinrich Winkler.

In *Seijutsu hongen taiyo kyuri ryokai shinsei tenchi nikyu yohoki* Ryoei provided a fairly comprehensive description of the heliocentric system. Not only was there a straightforward account of the solar system, but the earth was identified as an integral member of that system. Planets and their courses were described in heliocentric terms. One limitation on Ryoei's translation, however, was that Adams's original was not truly an astronomical work but rather a text designed for navigation. Thus, many of the scientific aspects of heliocentricity were not elicited.

Perhaps because of Ryoei's role as a translator who was not himself a trained astronomer, there is no specific evidence of his having recognized the revolutionary nature of the heliocentric theory. In fact, there is some evidence to the contrary, that is that he himself was somewhat uncertain of the validity of heliocentricity. Nevertheless, his translation was an accurate one, and in time others sought to

popularize the new concept. Moreover, that *Seijutsu hongen taiyo kyuri ryokai shinsei tenchi nikyu yohoki* was a landmark in the introduction of Western science into Japan is self-evident.

Unlike the example for the knowledge of Western medicine in Japan, *Kaitai shinsho*, which was translated in Edo, the astronomical watershed appeared in Nagasaki. Moreover, unlike the individual initiative shown by Ryotaku and Gempaku in translating *Onleed-kundige tafelen*, the first Japanese sources for the Copernican system were translated on order from the Bakufu. Further, though Ryotaku and Gempaku were well-qualified physicians, Motoki Ryoei was not a scientist and never thought to verify his translations by direct observation.

The contrast evident also in the activity of the *tenmonkata* at Edo and of the interpreter-astronomers at Nagasaki, all employees of the Bakufu, is intriguing. Edo astronomers were really not astronomers but technologists involved in specialized subjects such as the calendar, geodesy and navigation, that is in applied astronomy. This was the astronomy of technological officials in a technological bureaucracy. Thus, the technology of astronomy ('the use of nature') was much more important at Edo than the philosophy of astronomy ('the understanding of nature').

For their part the Nagasaki interpreters who did not have to use natural phenomena for a purpose were perhaps able to deal more dispassionately with basic questions about the universe, the heavenly bodies, events in nature, etc. Further, since thorough classical Chinese training was still a prerequisite for bureaucratic service, those scholars employed as *tenmonkata* not only had been nurtured on the traditional world-view but were deeply interested in it and impressed and influenced by it. Without similar extensive Chinese classical educations and acting merely as translators and transmitters of information from the West, the Nagasaki interpreter-translators working far from the capital were bound by none of the restraints operative in the case of the Edo *tenmonkata* and could perhaps deal more freely with Western physical astronomy and with Western theories of the universe. Nevertheless, the psychological barriers to the acceptance of new ideas which were operative in the case of the Edo astronomers were apparently almost equally operative for the Nagasaki interpreters.

In accordance with his instructions to translate materials dealing with geography, navigation and the calendar as well as astronomy,

Ryoei's other works included: *Oranda chizu rayakusetsu* (Brief explanation of a Dutch atlas) (1771) translated from a Dutch version of the German original, *Geographie van Europa, Portugal, enz.* (Amsterdam, 1733) by Johannes Hübner (1668–1731); *Bankokuchizusho wage* (Japanese translation of a world atlas) (1789); *Oranda kaikyosho* (Book of Dutch shipping) (1781); and *Jitsugetsukei wage* (Translation into Japanese of the measurement of days and months) (1776) translated for the daimyo of Hirado, Matsuura Seizan (1760–1841).

Working with Ryoei on his various translations were the interpreter Yoshio Kosaku and Matsumura Mototsuna (Suigai) (d. 1779) who was an official interpreter of Chinese and had taken up the study of Dutch under Nishi Zenzaburo. Mototsuna himself translated from Dutch *Oranda kokairyakki* (Brief record of Dutch voyages). In 1779 on the recommendation of the *opperhoofd* Isaac Titsingh, the Satsuma fief appointed Mototsuna as teacher of mathematics and astronomy at its school, the Meijikan.⁴⁰

Miura Baien (Yasusada) (1723–89), a Confucianist of the *kogaku* school and a physician from Kunisaki in the Kizuki domain, followed the Ptolemaic theories in his earliest work *Gengo* (Original talks), a treatise on philosophy, cosmography and astronomy. As an exponent of a self-reflective and logical philosophical system (*jorigaku*), he proved himself interested in details and in new hypotheses. Baien attacked the Chinese concept of *Inyogyosetsu* (ying–yang and the five elements), but he contended that in nature there were positive and negative existences which if studied would reveal new truths. He wrote that the negative *ki* (*inki*), not the moon, is that which creates the night and is a shapeless force contrasting with the shape of the sun. His positive–negative system also contrasted a moving heaven with a stationary earth.

At first Baien seems to have read astronomy books based only on traditional Chinese concepts which espoused the theory of the movement of the heavens. However, in 1778, he went to study at Nagasaki where he heard new astronomical explanations and for the first time was told about heliocentricity. Among his informants were Matsumura Mototsuna, Motoki Ryoei and Yoshio Kosaku at whose house Baien saw two celestial globes and a telescope. That Baien was amazed by and interested in the Copernican heliocentric theory but was unable to accept it can be seen from his opinions as stated in his last two books *Zeigo* (Superfluous talks) and *Kango* (Daring talks). For example, he noted in *Zeigo*:

I met an interpreter who told me that for 100 years the theory is proclaimed in Europe that the earth turns round the sun. Stars, earth, and moon turn around the sun. I have deeply reflected but cannot understand it. I presume that both, the sun and the earth, have an orbit round them, of which they are the center.⁴¹

Nevertheless, the impression which these Nagasaki contacts made on Baien was profound, and his reactions in several respects were remarkably flexible. He was greatly attracted by what he was told was at the core of European science, namely an exhaustive inquiry into the properties of things, and he noted with disdain the overweening Chinese concern for the reason why things are as they are. Baien especially decried those who held fast to the view that the earth was flat without any investigation of actual conditions.

Thus, if one wishes to know the universe, he must first understand the form of the universe, the movements of the sun and the moon. Astronomers and geography books will teach us about such things. Since European sciences entered Japan, by means of observation and experiment our information has become more exact than before.⁴²

Baien was seemingly less attached to the traditional Chinese *Weltanschauung* than most of his contemporaries. Although he could not quite comprehend heliocentricity, his willingness to consider it and his general grasp of the European scientific attitude mark him as a key figure in the evolution of Japanese science in the latter half of the eighteenth century.

Shiba Kokan (1747–1818), who is perhaps best known as the outstanding student of Western oil painting⁴³ and Dutch copper-etching technique, early studied Copernican theory, and his contribution to the popular acceptance of and the spread of heliocentricity in Japan was great. Kokan, as is evident in his painting,⁴⁴ was motivated by an attitude of realism which led to his particular concepts of astronomy and geography. Although Kokan never developed as an original thinker in science, he was an extremely important transmitter of Western technical knowledge to Japan. Much of his writing was simply copied from his Japanese predecessors with a few of his own bits and pieces added. Moreover, since Kokan himself did not know the Dutch language, he was dependent on translations done by others. Nevertheless, his individual attempt at a search for scientific objectivity in an era of restricted intellectual activity confirms his historical significance.

In the late eighteenth century those Japanese who were interested

in Western-style painting, as Kokan was, might perhaps be broadly described as nascent scientists who in addition to art extended their concerns into such fields as astronomy, electricity, geography, mathematics, and the like. Thus, Western art was for them a means by which to understand better the truths of nature. For instance, that which Kokan gained on his visit to Nagasaki and which he described in *Saiyu nikki* (Diary of a trip to the West) (1788) was as much an appreciation of Western science as it was more information on the technique of European painting.⁴⁵

As he became increasingly acquainted with the principles of Western art, Kokan began to interest himself in theories of the universe. In 1793 in his *Chikyu zenzu ryakusetsu* (Brief explanation of a complete map of the world), Kokan did no more than introduce heliocentricity. However, in the preface to *Oranda tensetsu* (Dutch explanation of heaven) (1796), in *Oranda tsuhaku* (Dutch navigation) (1805), in *Kopperu tenmon zukai*⁴⁶ (Copernican astronomy illustrated) (1808), based on the same Dutch translation of George Adams's text which Motoki Ryoei had translated, and in *Chitengi ryakuzukai* (Brief illustrated explanation of the celestial globe) (1808), Kokan explained the heliocentric theory in some detail and for the first time in Japan clearly identified the name of Copernicus with the system he delineated.

Kokan was the first 'popularizer' of Copernican ideas in Japan, and, unlike the works of Motoki Ryoei on which Kokan's were largely based, Kokan's writings were freely printed and circulated. Not only did Kokan as an unaffiliated writer find it easier to publicize his views than official interpreters or astronomers, but unfettered by the requirements of utility placed on official scholars, he was also able to speculate more widely on Western concepts of the universe. Kokan also included a sort of social commentary in several of his treatises. For example, in writing that in Europe aristocrats and businessmen were treated as equals he was seemingly commenting on Japanese inequality. In his unpublished *Tenchiritan* (Tales of the principles of heaven and earth) (1816), by comparing those who did not accept heliocentricity to ants crawling through sand, Kokan was apparently indirectly attacking the traditional Confucian view of the universe.

Interestingly Kokan aroused no reprimand from the Bakufu for his opinions even though they were mostly made public through his published writings. In attempting to discern why Kokan in particular seems to have had a surprising amount of leeway, it is important to

keep in mind that Kokan held no official post. Further, he did not know the Dutch language and was not really in the circle of *Rangakusha*. Thus, he was a dilettantish 'loner' whose main preoccupation was his painting. Accordingly, because of his peripheral intellectual position, his writings were not taken very seriously by either Tokugawa officialdom or by the scholarly community. And his implied criticisms were probably regarded as those of an eccentric gadfly.

Shizuki Tadao (Nakano Ryuho) (1760–1806), adopted into the Shizuki family as the eighth generation of hereditary interpreters, after only one year as an apprentice interpreter, retired from active duty in 1777 due to illness and began to study astronomy under Motoki Ryoei. Seemingly living on the income of his real father, a reputedly wealthy Nagasakian, Tadao was able to devote the rest of his life to the study of Western science. His contributions to Japanese scholarship are many and varied, but all are worthy of the remarkable and pioneering scholar that Tadao was.

Tadao's scholarly productivity (none of which was actually published during the Tokugawa Period) was in the main devoted to such subjects as astronomy, physics, mathematics and ballistics,⁴⁷ but he also studied geography and history⁴⁸ as well as the structure of the Dutch language.⁴⁹ He was the first Japanese to introduce Newtonian theories, although he himself never encountered the original writings of Newton. For some twenty years Tadao worked over the Dutch translation by Johan Lulofs (1711–68), *Inleidinge tot de waare natuuren sterrekunde* (Leiden, 1741), of John Keill's (1671–1721) *Introductiones ad veram physicam et veram astronomiam* (London, 1725).⁵⁰

The ultimate result of Tadao's great exertions over the Lulofs annotated translation of Keill was the completion of *Rekisho shinsho* (New book of calendrical phenomena) (1798–1802). This is not a direct translation of Lulofs's work but is a selected summary omitting some parts entirely and including a significant number of Tadao's own notes and comments. In particular, Tadao omitted the numerous references in the original to the deistic God who was given great credit for the essential harmony and symmetry of the universe.

In *Rekisho shinsho* Tadao went well beyond Motoki Ryoei in his explanation of Copernican heliocentrism, but he was unable to accept the theory unreservedly. Like his predecessors and his successors during the Tokugawa Period, Tadao was still encumbered with the necessity of reconciling Western science with Japan's Chinese

intellectual heritage. In fact, he excused the Chinese for not having articulated heliocentricity by suggesting that they were concerned only with observation of the heavens and therefore had no need to theorize about such abstractions as heliocentricity. Too, like Ryoei before him, Tadao sought to overcome the geocentricity versus heliocentricity dilemma by defusing the argument. He contended that movement of the earth was relative in terms of the point of reference, that is, if observed from the sun, the earth was moving and vice versa. In this fashion, he suggested that there was no real difference between the ancient Chinese and the Western point of view.

Moreover, despite an apparent comprehension of Newton's laws of motion, Kepler's law of planetary motion, Christian Huygens's (1692–1761) theorems of circular motion, etc., Tadao's understanding was, in the end, delimited by the predominant Neo-Confucian ideological orientation of his era. His attempt to make Newtonian concepts fit into Chinese natural philosophy, while understandable and even impressive, prevented his attaining an accurate and profound knowledge of Western science.

Also, although Tadao did remarkably well in mastering Western mathematical formulae and principles used in physics and astronomy, he seems to have been unable to understand mechanical and dynamic concepts. Not only was there no Sino-Japanese tradition of such scholarship, but 'Japanese or Chinese equivalents for "matter," "force," "corpuscle" and the like did not exist'.⁵¹ Nor was it possible to test physical theories in the way in which the Dutch-style physicians could verify the new anatomy or therapy by dissection or by treatment or in which the Dutch-style astronomers could attempt to apply their new knowledge by calendrical predictions. Perhaps most frustrating of all was the fact that there was no one in Japan with whom Tadao could discuss the theories with which he was confronted in the Keill translation. He was himself the 'dean' of Japanese scholars of physics in his own time, and certainly no member of the Dutch factory at Deshima was even remotely qualified to deal with the kinds of problems with which this lone Japanese scholar was wrestling.

Like the writings of Motoki Ryoei, those of Shizuki Tadao circulated only in manuscript to a relatively few especially interested colleagues and students. Also, like the work of Ryoei, Tadao's scholarship failed to attract much attention from the official *tenmon-kata* at Edo. Unlike the translations of Ryoei, however, those of Tadao were not done on order from some daimyo or from the Bakufu itself

but were rather the independent work of a practically self-taught and thus somewhat rudimentary physicist. Perhaps one other unfortunate similarity between the two Nagasaki *Rangakusha* needs to be noted, namely that the true importance of the accomplishments of Motoki Ryoei and of Shizuki Tadao has only been recognized by recent researchers. That is, in their own time Ryoei and Tadao were practically unknown and minimally influential.

Asada Goryu (Ayabe Yasuakira) (1734–99), Japan's Galileo Galilei, the fourth son of a samurai of the Kizuki fief and a close associate of Miura Baien, was a self-educated and always avid student of both medicine and astronomy. While he was serving as *han* physician, in 1763 at the age of 29 he attracted public attention by predicting accurately an eclipse that did not appear on the calendar. After trying several times to resign his post, in 1769 he left his domain and went to Osaka where, while supporting himself by practising medicine, he studied astronomy with a home-made telescope. He also took on a number of students who wanted to study astronomy under him.

Goryu was especially influenced by certain Sino-Jesuit works he was able to obtain, and, though he was extremely interested in Dutch learning, it is unlikely that he had any Dutch-language competence, and it is not known whether he possessed any Dutch books on astronomy. Goryu is generally credited with being the first Japanese to examine in depth the laws of Kepler. In fact, in his own plotting of eclipses and of the waxings and wanings of the moon, Goryu had in some instances advanced as far as had contemporary Western astronomers.⁵²

In 1795, the Bakufu requested Goryu to undertake a revision of the calendar since his pre-eminence in this field had come to be nationally recognized. He himself adamantly refused any personal participation because of his advanced age, but he recommended two of his pupils, Hazama Shigetomi (Taigyō) (Juichiya Gorobei) (1756–1816) and Takahashi Yoshitoki (Toko) (1764–1804) for the task. They received their appointments to the calendar bureau in Asakusa, Edo, the same year (again calendar revision had reverted to the shogunal capital at Edo) and by 1798 had completed a new calendar which was promulgated as the so-called calendar of the Kansei period (*Kanseireki*), the first time the Japanese had succeeded in adopting Western measurements in a calendar reform.

The official invitation to Goryu to assist the Bakufu in developing a new calendar was significant. The task had originally been assigned to

the official astronomers; however, contrary to the expectations of the shogunate, the hereditary *tenmonkata* who served in Edo had not mastered the laws of Kepler and thus could not construct an accurate enough calendar. When the government turned to Goryu, it was an admission that their own men knew less than a self-taught amateur astronomer. Such a decision, then, seems to have had two important implications. One was that it was an attempt to continue and to bolster the practice of drawing into the official service of the government men of substantive scholarship, particularly of Western learning, so that this knowledge might be closely controlled by the Edo rulers and so that it might be turned to their advantage.

Another and quite different implication was that the recognition which was obvious in this summons of Goryu to the capital may have given impetus to an increase in independent scientific investigations, especially in *Rangaku*, by persons in every social stratum. Perhaps this latter result may have further crystallized when at the refusal of Goryu to accept the invitation two of his pupils were requested to enter the astronomical bureau.⁵³

Hazama Shigetomi was a wealthy Osaka pawnbroker who built his own observatory and at whose expense and direction many new and precise instruments were constructed. However, despite his obvious accomplishments, when Shigetomi was appointed by the Bakufu, since he was a *chonin* he could only be officially named as an assistant, while Yoshitoki, as a samurai, though from the relatively lowly background of the son of a police constable, could be appointed a *tenmonkata*.

Takahashi Yoshitoki is perhaps best known for his work on the manuscript translation *Rarande rekisho kanken* (Private view of Lalande's calendrical book) based on the Dutch translation⁵⁴ of *Astronomie*, first published in 1764 and then republished in a second revised and enlarged edition in 1771, by Joseph Jerome Le François de Lalande (1732–1807). Yoshitoki, realizing the importance of this work by the French mathematical and astronomical genius, had secured a copy in 1803 and worked on its translation unstintingly until his death on New Year's Day 1804.

Even though he left the translation incomplete, in the relatively brief time at his disposal, Yoshitoki was able to accomplish an impressive amount. However, he faced two major obstacles. The first was that his knowledge of Dutch was quite limited, certainly more restricted than a number of his *Rangakusha* contemporaries. The

second was that certain aspects of his astronomical conceptualization were simply inadequate to deal with a work of the sophistication of Lalande's. Indeed, Yoshitoki referred in his notes to the section in Lalande where he explained the laws of Newton as 'unintelligible'.⁵⁵ Moreover, Yoshitoki, like his predecessors, regardless of his recognition of the significance of Lalande, was unprepared to break with the officially approved Chinese astronomical tradition. Much like Shizuki Tadao, Yoshitoki sought either to avoid certain 'controversial' matters such as heliocentricity or to place what he learned from Lalande within a Confucian context. As attractive intellectually as it is to present-day commentators to speculate on the 'might have beens' of a true acceptance of Western science by a Tadao or a Yoshitoki, that it did not happen is surely understandable in the light of the heavy hand of the state in setting the parameters of inquiries and the circumscriptions of responses to those inquiries.

An effort to complete the translation of Lalande's *Astronomie* was embarked upon by two sons of Takahashi Yoshitoki, Takahashi Kageyasu (1785–1829), the eldest son of Yoshitoki, known to the Dutch as 'Globius', and Shibukawa Kagesuke (1787–1856), second son of Yoshitoki, adopted as an heir by the hereditary *tenmonkata* family Shibukawa. Hazama Shigetomi also participated in this work, but he died in 1816. Kageyasu perished in the aftermath of the tragic 'von Siebold affair' (see chapter XIII below), so that by the time the section on the calendar in Lalande's treatise was finished in 1836 and published under the title *Shinko rekisho* (Calendar book by the new technique), Kagesuke was the principal author.⁵⁷

The next year, 1837, a fellow *tenmonkata* of Kagesuke, Yamaji Kaiko (Yukitaka),⁵⁷ published *Seireki shinpen* (New treatise on the Western calendar). This was the translation of *Grondbeginsels der sterrekunde* (Amsterdam, 1772), by Pybo Steenstra (d. 1788), lecturer in mathematics at Leiden University and later at Amsterdam. Then, in 1843 still another calendar reform, *Tenpo*, was adopted by the Bakufu based on the Kagesuke translation of Lalande and the Yamaji Kaiko version of Steenstra.

This was the last such effort prior to the Meiji Restoration and as such it was also the zenith of the work of the Tokugawa-appointed *tenmonkata* whose major function had been from the outset the correction of the calendar.⁵⁸ However, the fact remains that the new *Tenpo* calendar was still not comparable to contemporary Western calendars and that much of the new scientific information which had recently

become available from the West was not incorporated into it. The principal reason for this was that the *tenmonkata* were under the aegis of the Bakufu which in turn restricted them to technical problems of the calendar and made it practically impossible for them to investigate the theoretical constructs without an understanding of which certain information from the West could simply not be utilized. Given this milieu plus the continuing commitment of the shogunate to Neo-Confucian orthodoxy, it is difficult to differentiate between what was officially forbidden and what was intellectually either ignored or misunderstood. It must be recognized, therefore, that scientific inquiry of the kind that emerged in the West from the seventeenth century onwards did not develop in Tokugawa Japan.

An exceptional example of a commoner who by virtue of his remarkable mathematical ability achieved distinction during the Tokugawa Period is Ino Tadataka (1745–1818). Born the son of extremely poor parents, he spent most of his childhood not in study but in the tending of fishing tackle at Kujukuri beach (Kujukuri-hama). However, by a twist of fate in 1763, he was adopted into the Ino family as a bridegroom for the only daughter of a fairly well-to-do landholder and merchant who had died in 1742. Tadataka brilliantly recouped the family fortunes by practising strict economy, improving a brewery business to which he fell heir, opening a rice market and establishing a wholesale firewood outlet at Edo. By the age of 30 he had so cleverly managed the family's finances that he then found leisure to pursue certain studies which had always interested him. Meanwhile, as a result of his services to the people of his village at times of natural disasters, his personal prestige increased greatly, and he was accorded treatment equivalent to that of a samurai. He began to neglect the conduct of the family business for the project of teaching himself astronomy.

Thoroughly imbued with his new scholarly interest Tadataka at the age of 50 retired completely from his business and moved to Edo where his house became the base of operations for his monumental land survey of Japan. It is interesting to bring out at this point that Tadataka had no formal education and that his background in the all-important Confucian classics was practically non-existent. The year Ino arrived in Edo, 1795, was luckily for him the same year that Takahashi Yoshitoki appeared in the capital. On hearing of Yoshitoki's skill in Western astronomical theories Tadataka immediately went to study with Yoshitoki and reaped the benefits of the combined

prowess of Asada Goryu, Hazama Shigetomi and of course Yoshitoki himself.

Tadataka's knowledge of Dutch seems to have been only fragmentary, and his information from European sources was of necessity second-hand. However, his eagerness to learn and to observe was certainly entirely his own, and his wealth was of considerable assistance in maintaining a constant supply of instruments with which to make his computations. A contemporary observer described Tadataka's seriousness of purpose as follows:

Since he was equipped with new astronomical instruments, he could not bear leaving the house. If he went out in the forenoon, he was back by noon to make an observation of the sun at noon; if out in the afternoon, he came home by dusk and observed the stars. He never talked at leisure unless the sky was overcast. When he talked with Toko [Takahashi Yoshitoki] on astronomy, taking no note of time, if he suddenly became aware of the oncoming of evening, he would flee in panic for home. It often happened that he would leave behind his small sword, pocket-book, and so-on.⁵⁹

As is well known, from 1800 to 1817, Ino Tadataka conducted the first complete survey and mapping of the Japanese islands. He began by proposing to the shogunate that he carry out at his own expense a field survey of Ezo. Actually this was not the first map of Japan,⁶⁰ for Nagakubo Sekisui (1717–1801) had produced *Nihon yochi rotei zenzu* (Complete map of Japan with latitudes and meridians) in 1775–9.⁶¹ Though showing the influence of Western astronomy and geography, this map was small and not based on any actual survey. However, Nagakubo had significantly received the rank of samurai as a reward for his contribution, and this fact contributed greatly to Tadataka's decision to try to make use of his own years of study in an undertaking which he hoped would win him appropriate official recognition.

The interest in Hokkaido among scholars at the turn of the nineteenth century had been stimulated by the increasing incursions of the Russians in that area and the resulting demand for accurate mapping in order to plan the defence of the coasts not only of the northernmost island but of all Japan. In 1799, Hotta Nisuke, a samurai of the Tsuwano *han*, had been sent out by the Bakufu to survey the sea lanes between Edo and Hokkaido. Thus Tadataka could propose an extension of this work which was indeed only a bare beginning. His motives for his survey then combined his personal ambition, the direction and encouragement of his mentor Takahashi Yoshitoki and the requirements of the times.

The original request of Tadataka for the permission of the government to make his surveys was channelled first through Yoshitoki, though the final negotiations were concluded by Tadataka himself. Since he had offered to defray his own expenses, it is interesting to note that the shogunate awarded him an allowance of money on a per diem basis although the amount was pitifully small in comparison with the scope of the enterprise being undertaken. The Bakufu also decided to accord him treatment as a lordless samurai – a rare privilege for a man of Tadataka's background. In 1804, in recognition of the work already accomplished, he became an official of the government by being made a member of a guild of samurai with fixed incomes who were entrusted with minor repairs at the shogun's palace (Kobushingumi), and he was assigned to the Astronomical Bureau. This gave Tadataka new prestige and further encouragement to carry on his survey. The maps of Japan which were produced as a result of his work are a monument to the very impressive ability and skill of an ambitious self-taught scholar whose achievements were undoubtedly influenced by the growing interest in Western science engendered by *Rangaku*. At the same time, the fact that Tadataka's successes were realized under Bakufu sponsorship provide another landmark in the Tokugawa policy of giving official employment to as many scholars as possible so as to keep the achievements and activities of these men under the closest supervision and control.

Honda Toshiaki (1743–1820), who taught mathematics at Edo according to the Seki school, was a specialist in economics and in navigation and an advocate of the Copernican theory. Toshiaki had studied *Rangaku* with both Nakagawa Jun'an and Otsuki Gentaku and was a friend of Shiba Kokan and Yamamura Saisuke (Shoei) (1770–1807), a retainer of the Tsuchiura *han* and author of *Teisei zoyaku sairān igen* (Revised and augmented translation of *Sairān igen*) (1802) which was an updated and corrected version of Arai Hakuseki's *Sairān igen* and in which Yamamura discussed heliocentricity. Toshiaki expressed his own views on heliocentricity in *Seiiki monogatari* (Tales of the West) (1798) as follows:

Everyone in Europe now knows about this theory, which was first given to the world some 280 years ago, but Chinese and Japanese do not even dream of such things. It is understandable that people think that the sun causes the day and the night, but some are of the opinion that every day a new sun is created, travels from east to west, and then disappears. . . . In recent years, however, European astronomy has been introduced to Japan, and everyone has been

astonished at the theory that the earth is actually whirling about. No one is prepared to accept it as the truth. Thus it is that in Japan great scholars astonished at the idea, have declared, 'If the earth were spinning about, my rice bowl and water bottle would turn over, and my home would be broken into bits. How can such a theory be true?' It is entirely to be expected that disbelievers are far in the majority. Even in Europe the Copernican theory was not at first believed, and only after generations of progressively-minded men was everyone finally converted to it.⁶²

Two scholars whose work in astronomical studies attained influence among some of their contemporaries were Yamagata Banto (Masuya Kouemon) (1748–1821) and Hoashi Banri (1778–1852). Both of these men had studied at the Osaka private Neo-Confucian school Kaitokudo which was known to have a positive attitude towards Western science. Such an attitude, incidentally, was in no way a diminution of the commitment of the Kaitokudo to Neo-Confucianism but reflected simply an appreciation of the practical or utilitarian aspects of Western technology, on the one hand, and an attempt to rationalize that appreciation, on the other, by suggesting that the ideas coming into Japan from the West had, in fact, originated in China.

Banto was a wealthy Osaka money lender, money changer, book collector and amateur astronomer. His role as a popularizer of the Copernican theory has been compared to that of Shiba Kokan. Banto's *summa* is his *Yume no shiro* (Age of dreams) (1802–20) which, though unpublished during the Tokugawa Period, circulated widely in manuscript. For his astronomical data Banto, though he is supposed to have studied with Asada Goryu, relied heavily on Motoki Ryoei, Shizuki Tadao and the translated writings of William Whitson (1667–1752), the English astronomer, popularizer of the work of his teacher Isaac Newton and successor to Newton at Cambridge.

Yume no shiro was unusual in that beginning with the mythical era of the *kami* it presented a powerful critique of Japanese history as well as sharp criticisms of Japan's traditional politics, economics and ethics. Nevertheless, Banto showed himself to be both a committed Confucian and a strong adherent of the Tokugawa system. Not surprisingly he wrote that Western knowledge had practical application in astronomy, geography, medicine and natural science generally and was useful, accordingly, to the strengthening of the feudal system in Japan.

Like others among his fellow astronomers, Banto was unable to

comprehend certain Western concepts, and even though he relied heavily on Tadao's *Rekisho shinsho*, Banto in his own writings emphasized Tadao's Neo-Confucian metaphysics much more than he did the Newtonianism of Keill. However, despite the apparent theoretical weakness of Banto's work, *Yume no shiro* contributed to the diffusion of astronomical information from the West.

In 1804 Hoashi Banri was named a teacher at the domain school in his native Hiji *han*. During his nearly thirty years as a teacher, while he adhered closely to his Confucian training, in his attitude towards the necessity of practical education, especially mathematics, Banri perhaps reflected his own training by a disciple of Miura Baien. Moreover, Banri was attracted by what he had heard about Western science and about 1818 began to study the Dutch language on his own.

Once he had achieved a certain mastery of Dutch he began to work with such books as Lalande's *Astronomie; Beginsels der natuurrkunde* (1739) by Petrus van Musschenbroek; and the medical writings of Johannes de Gorter, Adolph Ypey, G. W. Consbruch and Anthelme-Balthazar Richerand. Moreover, Banri was familiar with the astronomical contributions of the French scientists Jean-Baptiste Delambre (1749–1822), Pierre Simon Laplace (1749–1827) and Pierre Mechain (1744–1804).

The culmination of his work was Banri's second draft in 1836 of *Kyuritsu* (Generalities of physics) which he would not allow to be published during his lifetime, ostensibly because he was dissatisfied with it and wished to improve it further. *Kyuritsu* was a lengthy piece in eight parts including sections on the origin of the calendar in China, Egypt and Greece; the universe; the solar system; the earth; the atmosphere; the stars; gravity; and chemical attraction. Banri stated clearly that he understood that the earth as well as the other planets were spherical in shape. However, whether to protect himself in his position as a teacher at the official *han* school or because he was unable to move intellectually outside the traditional Neo-Confucian context, in *Kyuritsu* Banri continued to demonstrate his preference for East Asian metaphysics over the physics which reached Japan from the West. In addition, like Yamagata Banto before him, Banri could not (or perhaps would not) penetrate the theoretical basis of Western science. Thus, in so far as the impressive list of Banri's Western sources is concerned, he did little more than translate parts of them and then proceed to point out how poor was the Westerner's understanding of the Neo-Confucian *Weltanschauung*.

The influence of Western heliocentric principles as learned from the Dutch was surprisingly strong among the *kokugakusha* or Shinto revivalists. This is of special interest since these scholars denounced both Buddhism and Confucianism as foreign doctrines and yet seemed cordial to Western learning. Of course this was not done in a spirit of reverence for Occidental knowledge. Yet though the *kokugakusha* employed *Rangaku* as a tool for their attack on Chinese ideology, their adherence to heliocentricity added to its prestige and dissemination.

Hattori Chuyo (1756–1824), for example, attacked the Chinese theory of the universe in *Sandaiko* (Three great thoughts) with the story that the earth was round. Another *kokugakusha* Motoori Norinaga (1730–1801) in his *Kogakuyo* (Outline of antiquities) said that by means of Dutch learning he knew the errors of Confucian teachings and that he owed this to the intent of the *kami*. Motoori similarly dismissed Buddhist cosmology as absurd and without foundation.

Such a Shinto propagandist as Hirata Atsutane (1776–1843) not only approved of Western heliocentricity but in addition actually employed the theological resources of Christianity in his assault on Buddhism. After centuries of domination by Buddhism, Shintoism had no real independent philosophical basis, and Atsutane turned to European sources to help bolster his new doctrines. He obtained copies of works by Matteo Ricci written in China over 200 years before, and he translated with few alterations two dialogues between Ricci and a Confucianist, substituting his own name for Ricci's. By this method Atsutane actually remodelled Shinto along Christian lines 'affirming his belief in a central divinity who ruled over all creation, rather than in countless gods of approximately equal powers, the usual Shinto view'.⁶³ He appropriated such concepts as the immortality of the soul, the existence of the devil, and reward and punishment as symbolized by heaven and hell. He even likened the first legendary Japanese man and woman, Izanagi and Izanami, to Adam and Eve. Most importantly from a theological point of view, Atsutane pointed to the remarkable coincidence of the centrality of the sun in the Copernican system and the central role of the Sun Goddess, Amaterasu Omikami, in the Shinto tradition, going so far as to suggest that heliocentricity may in fact have originated in Japan and may have been transmitted to the West at a much earlier time.

Although Atsutane never read any Dutch books, he was un-

doubtedly familiar with the writings of such scholars as Nishikawa Joken and Yamamura Saisuke. Atsutane believed that the true meaning of Western learning was found in the fact that the European nations were remarkable places 'which have established the limits of human knowledge and recognize the grandeur of God'.⁶⁴ His heliocentricity, however, was carefully circumscribed by the limits of his world. According to Atsutane, the sun at the time of the separation of heaven and earth developed as a pure component, and Japan surpassed the rest of the world in the land and character of its people since at the time the sun 'sprouted' it became a navel between heaven and earth. He rationalized his acceptance of Western science by saying that he was integrating it into a spiritual image of the world whereas progressive Confucianists and *yogakusha* looked at it only from the point of view of studying natural laws in order to increase material wealth.⁶⁵

Atsutane's disciple Tsurumine Shigenobu (1786–1859) affirmed his heliocentric viewpoint in such works as *Ame no mihashira* (The sacred heavenly pillar) (1821), *Kyuri wakumon* (Inquiries about natural laws) (1834), *Chiten shinzu* (New diagram of the earth revolving) (1827) and *Sansai kurisho* (Book of the natural laws of the three powers (heaven, earth and man), (1836).⁶⁶ Again, as in Hirata's case, the essential thrust of Shigenobu was to use Western science to combat Buddhist and Neo-Confucian cosmologies and to attempt to reinforce the Shinto myth of creation.

Since Shigenobu knew very little if any Dutch, he was dependent for his knowledge of Western astronomical theories on the writings of Shizuki Tadao, Yoshio Nanko and Aochi Rinso. However, since Shigenobu was utilizing such materials for didactic, propagandistic purposes, his understanding of Western scientific principles was minimal. He argued, for example, that the discoveries of Western scholarship were already known to the Japanese as evident in the *Kojiki* and the *Nihon shoki*. Indeed, Shigenobu went so far as to suggest that there were important analogies between Western physical concepts and Shinto deities!

Suzuki (Hozumi) Shigetane (1812–63) also explained the ancient legends of Japan by means of Western astronomy in *Koshi taigen zusetsu* (Illustrated explanation of the origin of the earth). Sato Nobuhiro (1773–1850), the economist, philosopher and Dutch scholar from a family of physicians in Dewa and associate of Hirata Atsutane, acknowledged his faith in European heliocentricity in *Yozo*

kaikuron (Theory of evolutionary development) (1824) which was said to have been copied from Yoshio Nanko's *Ensei kansho zusetsu*.

Finally, the Tsuwano samurai Okuni (Nonoguchi) Takamasa (1792–1871) should also be mentioned. Okuni apparently studied the sacred books of Japan, the classics of China and India and certain natural philosophical treatises of the West. In contrast to the exclusivist attitudes of both Japanese scholars of the Chinese classics and of the *kokugakusha*, Okuni felt that only by taking the best elements from all the philosophies of the world could a new enlightenment be stimulated in Japan. The eclectic beliefs which he expounded were referred to by some as 'Dutch-studies compromise Shinto' (*Rangaku shugo Shinto*).⁶⁷

It has been seen in the above discussion of the advent of heliocentricity in Japan and of the spread of the influence of Western astronomical knowledge that the most important results appeared after the mid-eighteenth century. This was an era of increasing urbanization, of the growth of trade, commerce and investment and, very significantly for the diffusion of *Rangaku*, of heightened intellectual activity and intellectual curiosity. It was also a time when the shogunal authorities were eager to capitalize on scholarly developments in order to utilize them, wherever possible, to augment a weakened agrarian economic structure and to bolster military defences in the face of renewed Western incursions.

The growth of city life also permitted an accumulation of wealth which provided a foundation for the development of scientific scholarship. In the shadow of the various Bakufu policies which were designed to formalize feudal society in the mid-seventeenth century, there was already evidence of the spread of a great commercial economy. And by the eighteenth century the position of the city dwellers as a class could no longer be disregarded. Under the influence of this group new tendencies in the culture of Japan were evident. Thus the so-called 'creative culture' was a direct result of urbanization which produced an environment congenial to the rise of Western studies, of natural science, and of the scientific view of the universe.

In particular, reference should be made to the role of Osaka, the bustling commercial centre of Tokugawa Japan. The special character of Osaka *Rangaku* was that its emergence paralleled the growth of a bourgeois *chonin* life-style in Osaka and had an intimate relationship with the new forms of popular culture flourishing in that fast-growing

city. Interestingly, this was a different atmosphere from the one in Edo which had seemingly been conducive to advances in medicine. Osaka, however, seemed to engender a rather strong sort of fascination with things Dutch, leading from the kind of basic concern with mathematics one might expect in a commercial environment to a serious study of Western astronomy and physics. Naturally, some of this kind of interest was little more than faddishness, characterized by the Japanese in such derogatory terms as *komoshumi* (hobby red-hairs) and *Ranpeki* (Dutch habits). However, in a more serious vein, the popular culture of Osaka seems to have given rise to the sort of practical rationalism which provided a basis for the investigation of Western science.

It was after moving to Osaka that Asada Goryu embarked on his astronomical research. His disciple, Hazama Shigetomi, was a prosperous pawnbroker. Yamagata Banto had grown rich as a money changer. Ino Tadataka, though not from Osaka, had made a fortune in brewing and in dealing in rice and in firewood. Whether by dint of research by the wealthy *chonin* themselves or by intellectuals sponsored by them, the study of natural science and of Western learning developed apace in the cities.

At the same time the existence of the *bushi* had become increasingly precarious and often resulted in a certain amount of discontent. As a consequence of this dissatisfaction, some of them too looked to the new ideas seeping in through Deshima. Asada Goryu was himself from a samurai family. Takahashi Yoshitoki inherited his father's humble samurai occupation as a police constable. Honda Toshiaki was born in Echigo where his father, a samurai, had fled after killing a man. All of these individuals turned to scholarship and specifically to the West with its new *Weltanschauung* in their attempts to better themselves and their compatriots.

The officials, within the limits of what they believed to be their need for knowledge from the West, encouraged certain Dutch studies and patronized scholars for the purposes of the shogunate. Although this was an important stimulus to the development of science, still the authorities looked upon Western learning and its concomitant natural science primarily as a convenience for maintaining their own positions. Neo-Confucianism was seen by the Bakufu as a faithful tool for feudal control, and the information obtained from Europe was to be used merely to shore up those places where Neo-Confucianism was somehow slightly inadequate. The Bakufu policy of using *Rangaku*

from the time of Shogun Yoshimune was never a result of the innate superiority of *Rangaku* but was rather directed at protecting a social order which was being gradually weakened.

Neo-Confucianism, of course, was the form and the ideology for the maintenance of the old order. Thus it was succoured mainly by the ruling class whose position was bound up with it. The *chonin* and many *bushi*, however, were societally displaced persons in that they were separated from the land which was the essential basis of the Tokugawa feudal system.

While theoretically, therefore, one might have expected these latter segments of eighteenth-century Japanese society to be critical of the regime and perhaps even to be harbouring 'revolutionary' thoughts, such was not the case. The proper mixture of Bakufu surveillance and control, on the one hand, and of ingrained respect for traditional learning, on the other, successfully prevented any anti-state activities from developing until the mid-nineteenth century. Even the increasing prominence of *Rangaku* in the Japanese intellectual world did not change the situation. The co-optation by the shogunal authorities of the best scholars of Western learning to serve in the bureaucracy combined with the inability of the *Rangakusha* themselves to break out of their Neo-Confucian intellectual mould meant that the main function of *Rangaku* for the remainder of the Tokugawa era would be to serve the state.

XI

Otsuki Gentaku and the spread of Rangaku

As has been seen in the two previous chapters, the principal lines of Western learning – medical-botanical and astronomical-calendrical – developed with increasing rapidity towards the end of the eighteenth century, which was a period of great activity in the so-called *Edo Rangaku*. After the turn of the nineteenth century, both as a result of the spread of *Rangaku*, on the one hand, and of the recognition of its utility and the desire to control it closely, on the other hand, in 1811 the Bakufu established an official translation bureau, Banshowagegoyo. The early nineteenth century, then, was not only an era of a general expansion of Dutch studies but also of the appearance of outstanding individual scholars whose encyclopedic knowledge encompassed several fields. Thus, despite the comparatively small number of men involved in the *Rangaku* movement and the obvious limitations on their work, much information on medicine, pharmacology, physics, chemistry, astronomy, cartography, geography, military science and art was disseminated. Perhaps these trends can be better understood by an examination of the career of one of the greatest *Rangakusha*, Otsuki Gentaku, with special attention to his many writings, to his part in the creation of a government translation bureau and to his large coterie of disciples.

Born in 1757, Gentaku was the son of the Dutch-trained physician of the Ichinoseki *han*, Otsuki Genryo (d. 1754). Genryo was official surgeon to the Sendai domain of which the Ichinoseki was a side branch. Although Gentaku was generally known to the public under the pen-name of Bansui, his given name was Shigetaka and his nickname was Shikan. At the age of 13 he began the study of medicine under Takebe Seian (1712–82), physician of the Sendai domain. Intrigued by tales of the Dutch-style medical skills of Sugita Gempaku and others, Gentaku at the age of 22 ‘shouldered his box of books’ and went to the capital to study. He placed himself under the tutelage of Gempaku who wrote of Gentaku:

I have found that Gentaku is a practical man by nature. He applied nothing without putting it into practice first; he never talked of things he did not fully

understand; he did not like superficiality. I liked him because of his character and his talent and taught him as well as I could. In the end I entrusted him to Ryotaku to guide him in the study of Dutch science. As I thought, he was so industrious that Ryotaku soon laid a foundation of knowledge which enabled him to understand Dutch books.¹

Thus, after a period of study under Sugita Gempaku, Gentaku became a pupil of Maeno Ryotaku. The latter, impressed with Gentaku's seriousness of purpose, opened to him his innermost thoughts, and now Otsuki's detailed knowledge of Dutch studies truly began.

In 1785, with the financial assistance of Kuchiki Masatsuna² (1750–1802), daimyo of Tamba Fukuchiyama and patron of Western learning, Gentaku went to study at Nagasaki where he lived at the home of the aforementioned interpreter Motoki Ryoei. He pursued his studies diligently, both with Ryoei and with Yoshio Kosaku. The following year Gentaku returned to Edo, and, after being appointed in May 1786, as physician of the Sendai fief with a stipend of 125 *koku*, he began his practice in his daimyo's house at Edo, Kyobashi, and devoted himself to *Rangaku*. The same year, 1786, in Honzaimokucho Edo, he opened Shirando, the first private school for Dutch studies in Japan, where until his death he maintained a leading centre of Western learning. By 1826 the names of ninety-four signatories sealed with blood appeared on the roster of Shirando with students from Tsugaru in the north to Hizen and Tosa in the south.

Between 1794 and 1814 at Edo, Gentaku had contact with the Dutch missions six times, and on the last three of these occasions, the *opperhoofd* was Hendrik Doeff. One subject that Gentaku kept raising with the Dutch was that of a 'father' of Western medicine who might parallel the so-called 'father' of Chinese medicine, a legendary emperor whose portrait or statue was paid homage on important occasions. In this regard, Gentaku had been much taken with a portrait of Hippocrates in a Dutch book. In 1799 Gentaku wrote a worshipful biography of Hippocrates and had Ishikawa Tairo (1762–1817), a Western-style artist, paint a portrait of the famed Greek physician. Gentaku's efforts on behalf of Hippocrates were eminently successful, and a sort of Hippocratic cult developed among Japanese Dutch-style physicians. Today some seventy tributes to and portraits of Hippocrates, in seeming imitation of Gentaku and Tairo, remain.³

In 1811, at the recommendation of the then director of the Astronomical Bureau, Takahashi Kageyasu, an office for the translation of

Dutch books was established within the observatory with Gentaku and Baba Sajuro comprising its first staff. Gentaku was promoted within his fief and his stipend was increased to 300 *koku* in 1812. Greatly impressed by his ability to translate, the Bakufu also authorized a monthly salary for him in 1818. He died in 1827 at the age of 71 and was buried in Tozenji, the temple at Edo which was later to serve as the site of the negotiations between Japan and the Western powers after the arrival of Perry. Gentaku's character is summarized in one Japanese biographical dictionary as follows:

Bansui was truly endowed with great ability. People criticized him for being too serious or narrow-minded, but those who were familiar with him over a long period were all influenced by him. He treated his servants strictly yet leniently, and they respected him. He never tired of carefully training his disciples. He was unselfish. He wore simple clothes. In later years he advanced within the clan hierarchy, but he quietly retired and devoted himself to patriotic endeavours.⁴

By means of close inspection of Gentaku's writings, the broad scope of his knowledge of the West may be better understood, and the development of his scholarship from its inception to its maturation with the establishment of the Bakufu translation bureau may be observed. In 1783, Gentaku compiled the highly important *Rangaku kaitei* (Steps to Dutch learning) (published in 1788) consisting of two volumes. This was the first work dealing exclusively with a European language ever composed and printed by the Japanese, and it became the indispensable text for all who would study the Dutch tongue. The first volume, which was somewhat in the nature of a propaganda tract for *Rangaku*, contained nine chapters: an introduction, words about trade, the advantages of trade with the Dutch, minute details, love of the Dutch language, the origin of Dutch learning in Japan, the establishment of *Rangaku*, the importance of foreign languages and advice to those who wanted to learn Dutch. The second volume was an attempt at a language textbook with sixteen chapters; letters, numbers, phonetics, transcription, pronunciation, meaning, how to learn Dutch, translation, how to translate a sentence, a capsule dictionary, examples of some nouns, syntax, articles, punctuation, Dutch books and a key to learning Dutch.

In the section on how to learn Dutch there is a fascinating insight into the methods of the scholars of those days:

At the beginning of the translation work at Nagasaki, first, after all understood how to read the letters, the writing, the spelling, and the composition,

they learned the idioms through books of everyday usage called *Samenspraak*. The first duty of the translators was to begin by learning these. After these were learned, they learned to write sentences called *opstellen*; and questioning their elders and making use of their friends or having the Dutchmen correct them, when they understood and acquired this skill, they interpreted freely. Though learning [Dutch] by passing the above steps became regular procedure, it was difficult to do so without being at Nagasaki; in particular, the pupils who came to me did not have this handed-down skill for translation work. When one tries to translate a book, remembering as many words as possible, even one by one while reading, putting one's heart into the particles and verbs, etc., and, going through the word order before and after and above and below, interest should be evidenced in the continuity of the words etc.; and without neglecting anything one should remember a great deal of the language. For example, put together the five letters *h e m e l*, read them 'heemeru' and they mean heaven; put together the four letters *a a r d*, read them 'aarude' and they mean earth. In this way proceed to learn the words one by one; charge them to the ear; and make up a special pamphlet setting up classifications according to the twenty-five letters of the alphabet. Then when you have a word like 'heemeru' write it in the place for the letter *h* and add the character for the translated word. Thus with hard work you should compile a book. In order to make a handbook put the Dutch first and the Japanese afterwards. If you do this, in a short while you will have committed to memory four or five hundred words, and afterwards by referring to this book you can find the meanings.⁵

In the preface to *Rangaku kaitei* Otsuki Gentaku wrote:

Until now China was considered the most civilized country. Holland, however, is superior because next to literature it possesses science.⁶

And, again, in the book itself:

Hide-bound Confucianists and run-of-the-mill doctors have no conception of the immensity of the world. They allow themselves to be dazzled by Chinese ideas, and, in imitation of Chinese practice, laud the Middle Kingdom, or speak of the Way of the Middle Flowery Land. This is an erroneous view; the world is a great sphere on the surface of which are disposed the various nations. Although boundaries are determined by nature, each people gives honorific names to the place where they themselves live. China is called the Middle Land, the Middle Plain, the Middle Flower, the Middle Kingdom, or else the Flower Capital, the Divine Continent. Similarly Holland calls Germany her motherland, 'Middelland', and our country proclaims itself to be 'Nakatsukuni' – 'The Land in the Middle.' England uses the location of her capital as the starting point in counting degrees of longitude and must have a corresponding manner of naming her country.

Speaking from the size of the country, Egypt, a territory of Africa, should be termed the center of the world. This would mean that China and Japan are at the eastern end of the world, and Holland and the other European nations at the northwest. But what excuse is there for us to adopt the proud usage of

China and speak of the Middle Flowery Land, or of the Flowery People, Flowery Ships, Flowery Things, etc.? For long years we have been imitating them, senselessly delighting in their ways without thinking of anything else. This has led to our excessive stupidity with respect to geography, and to a limitation of the knowledge we have gained with our eyes and ears. Thus it is that there are people who know only the names of China and India, and some extreme cases who think that Holland is a Chinese possession. Or, they consider every foreigner, apart from the Chinese, to be a barbarian unworthy of comment. How crude and how narrow such learning is!⁷

Despite such apparent fulminations at the dominance of Chinese thought in Japan, one must recognize Gentaku's overall consistent acceptance of and respect for the Confucian intellectual tradition. Therefore, quotations such as the preceding ones should probably be evaluated as essentially defensive, that is as Gentaku's effort to 'legitimize' his commitment to *Rangaku* in a scholarly world which was suspicious of the validity of something as exotic as Dutch studies.

Whether by tradition or by design, Gentaku's basic point of view, as expressed in *Rangaku kaitei*, was to interest himself in foreign countries in the West such as Holland as sources of practical information. Thus, despite his criticism of Confucianism for its narrowness, Gentaku continued to articulate the opinion that *Rangaku* was not truly 'scholarly' in the Chinese sense of the term. Moreover, he contended that while there were certain valuable things to be obtained from foreign countries such as, for example, medical techniques unknown in Japan, it would be most regrettable for the Japanese to waste good money on 'useless things'.

Another facet of Dutch studies – its support by certain wealthy *chonin* – was evident in the publication of Gentaku's *Rokubutsu shinshi* (New record of six things⁸) (written in 1780), which appeared in 1786. According to a copy of this work in my possession, it was 'Kenkado' who sponsored its publication. Gentaku, in 1785 on his way to and from Nagasaki, had been the guest at Osaka of Kimura Takichiro (Kenkado) (1736–1802), a prosperous sake distiller also known as Tsuboiya Kichiuemon. Kenkado was a bibliophile who collected books on science, art, minerals, precious stones, animals and plants. It was at his request and under his sponsorship that Gentaku wrote *Rokubutsu shinshi*.

In 1787, Gentaku wrote the preface to *Komo zatsuwa* (Red-hair miscellany) by Morishima Churyo (1750–1808),⁹ the younger brother of Katsuragawa Hoshu. *Komo zatsuwa* was based partly on the *Oranda banashi* of Goto Rishun and included other information supposedly

obtained from the Hollanders at Nagasaki by Hoshu and Gentaku himself. The section on European art includes reproductions from the aforementioned work of the Flemish painter Gerard de Lairese, *Groot Schilderboek*, and also has illustrations by Shiba Kokan which are copies from the plates in a book of Joh. Swammerdam (1637–80), published posthumously under the sponsorship of Hermann Boerhaave with a Latin version of the Dutch text by Boerhaave's student Hieronymus David Gaubius (Gaub) (1704–80).¹⁰

Some of the material in *Komo zatsuwa* was critical of certain then current Japanese practices. In particular, Churyo expressed his high regard for the charitable nature he attributed to the Dutch as evidenced in their poorhouses and orphanages. These latter he described as veritable paradises which thus avoided infanticide, a custom prevalent in Tokugawa days. He also fancifully quoted a Dutch geography book as ridiculing Chinese ideographs. Churyo's supposed Dutch source vilified the time-consuming Chinese characters as the height of stupidity when only 'twenty-five' letters were sufficient for European countries. By such an attack supposedly taken from a foreign work, he, of course, protected himself from the wrath of the Bakufu and at the same time showed his concern for the possibly stultifying effect on Japan's progress of what he described as 'a vexatious system of perplexities'.¹¹

In 1788, when Otsuki Gentaku's *Rangaku kaitei* was offered to the public, Yoshio Kosaku came to Edo with the Dutch mission, and Gentaku presented him with a copy of the book. Kosaku said: 'Though we are interpreters by profession and well paid, we have not written any work like it. Seeing the book, I am ashamed that I have been of so little use, and accomplished so little.'¹² The same year, 1788, *Ransetsu benwaku* (A clarification of misunderstandings in theories about the Dutch) was prepared for publication. This was a written record supposedly taken down verbatim by Arima Gencho (Bunchu) in the form of a dialogue, with the pupil, Arima, asking the questions which drew out learned replies from the master Gentaku. Though Arima died before the blocks were cut, *Resetsu benwaku* was eventually published in 1797 by one of his fellow students and was given the title *Bansui yawwa* (Evening tales of Bansui). In its coverage of over fifty different topics, it emphasized the broad knowledge of Gentaku and the extensive training he must have been able to give his energetic disciples. Of special note is the independent viewpoint expressed on many issues and the frequent praise of Western achievements.

Gentaku attacked many of the common fallacies heard throughout Japan about the Dutch – that they were short-lived, that they had no heels, that they had eyes like animals, that they were all unusually tall, that they lifted one leg when urinating, etc. In addition, Gentaku extolled the healthful character of the Dutch diet and eating habits, and he detailed the benefits of Dutch-style medical treatment.

In 1790 Otsuki Gentaku completed a translation of *Yoi shinsho* (New book on surgery) (published in 1825), a work which had been begun by Sugita Gempaku. *Yoi shinsho* was the first Western surgical text to be translated into Japanese. It derived from *Chirurgie*, one of the seminal writings of the German anatomist and surgeon, Lorenz Heister (1683–1758). Since Heister's book was eventually translated into all the languages of Europe, Gentaku was able to use the Dutch edition *Heelkundige onderwyzyngen enz.* (3rd printing, Amsterdam, 1776), translated by Hendrik Ulhoorn (1692–1750). The Japanese version containing 250 chapters was divided into three sections: (1) the healing of wounds, bruises, and tumours; (2) operations; (3) treatment of diseases of the internal organs.

Gentaku wrote *Ran'en tekiho* (Picking blossoms from a field of orchids) in 1792. The title was an obvious play on the character *ran* which meant Holland as well as orchid. This work was a collection of essays, translations of Western materials, official reports, and various remarks on medicine, pharmacology and natural history. Among the identified sources for this work were John Johnston's much used book on animals and the 'nature' encyclopedia written by the German J.J. Woyt, the 10th printing of which was translated and annotated by J.C. Schmellentin.¹³

Taisei baisoho (About occidental syphilis) came from the pen of Gentaku in 1793. For this volume he drew on the 1748 (7th printing) Amsterdam edition of *Het nieuw examen van land- en zee-chirurgie* by Johannes Verbrugge (d. 1681) with a supplement by Johannes Daniel Schlichting. *Taisei baisoho* is in a question and answer format. First there is a short history of syphilis; next syphilis is described as an infectious disease caused by a congealing of a thick liquid with bad blood in the body; finally methods of treatment are detailed. Gentaku had a particular theory about the origin of syphilis:

This sickness is one of filthy and evil origin, and it emerged from America. I.e. from the time of Christopher Columbus (the man who opened America and whom the Chinese call Ko Lung) in the year 1490 (since this is 1793 in the west, it was 300 years ago), for the first time [syphilis] spread through the

realms of various states. During the reign of Ferdinand II of Spain the American territories were opened up for the first time. When Columbus's followers returned to the home country, they brought syphilis. There were those who had relations with unclean women who had acquired this poison. These persons went overseas and brought it to Naples in Italy. The people of Naples transmitted it to the French at that time. This was the reign of Charles VIII of France. The harlots and prostitutes in the various territories of Spain who had this disease infected the soldiers to whom they made love and passed it on to them, and it quickly spread throughout the world. Therefore in France this was called the Naples-sickness. . . . Then it was carried to Germany, and many Germans fell victim. Therefore, it is called French-sickness.¹⁴

In 1794, Gentaku made a sort of record of the occasions of the visits of the Dutch, of the various questions posed by the Japanese scholars at Edo and of the answers of the Netherlanders. In the preface of this book, *Seihin taigo* (Talks with Western guests), one gains a valuable insight into the attitude of the Bakufu to the activities of the *Rangakusha*.

We owed it to Prof. Katsuragawa's kind help that we could personally talk to the Dutch. But we owed it to the renown of our study that we, in spite of being small vassals, could talk to the guests of the shogun and question them. I mention this with deep emotion and joy, to make this memorable fact immortal.¹⁵

From this quotation two important facts can be perhaps deduced. One was that the shogunate by its indulgence in the matter of the interviews with the Dutch recognized that the *Rangaku* movement not only was existent and important, but that by providing the opportunities for these meetings with the foreigners the government could both prevent any clandestine contacts and could better control the activities of the native scholars of Western learning. Further, the very humble nature of Gentaku's verbiage was designed to demonstrate to the authorities appreciation for their intervention on behalf of the circle of *Rangakusha* and thus to try to assure continuing permission for their researches.

The following year, 1795, Gentaku composed *Rangaku haikai* (Understanding Dutch studies) which was designed specifically for the students at Shirando, many of whom found the *Rangaku kaitei* too difficult to use as a beginning text. Also in answer to the many requests of his students, in 1791, Gentaku put out *Kanno shingen* (Correct words on the functions [of the internal organs]) about which he said:

The foundation for European medical science is a thorough study of internal treatment. Without it you cannot understand the exactitude of its theories. I should like to answer the questions of my students by writing a book on the functions of the organs. In this book a light will be thrown on the difference of theory and truth, right and wrong, conceptions, exactitude, and roughness in medical theories.¹⁶

In fact, this work was Gentaku's summary translation of Dicten's Dutch translation of Kulmus's *Ontleedkundige tafelen* . . . which had been the basis of Sugita Gempaku's monumental *Kaitai shinsho*.

A good example of Gentaku's geographical curiosity can be seen in *Hyonan bunryaku* (Brief record of castaways in the south) (1798). This book assembled reports of Japanese castaways in Annam and combined with them information relating to the geography of the same area found in Japanese, Chinese and Western books. Also in 1798, Gentaku completed *Jutei kaitai shinsho* (*Kaitai shinsho*, extensively revised), which was eventually published in 1826, the year before Gentaku's death. This project was supposed to have occupied Gentaku for over ten years and was far more detailed and more accurate than the original by Sugita Gempaku.

As Russian incursions increased in the north of the country and as rumours spread of the approach of Russian and other foreign (non-Dutch) ships to Japanese shores, Otsuki Gentaku turned his talents to these problems. He wrote both *Kankai ibun* (Strange tales of voyages on the oceans) (1807), a 15-volume report of 40 interrogations of 4 castaways returned from Russia, and *Hokuhen tanji* (A search for facts about the northern area). About England, Gentaku compiled *Hoei mondo* (Questions and answers about unidentified things) (1807) in which he reported clearly the circumstances and power of the British and his concerns over their eastward advance. Similarly, his *Hojutsu kigenko* (Thoughts on the origin of gunnery) (1808) grew out of his anxiety about the vulnerability of the frontiers.

As late as 1816 Gentaku was still active as a translator and a writer. In that year *Yoishinsho sekkatohen* (Compilation on smallpox inoculation), a translation of the chapter on inoculation in Ulhoorn's Dutch translation of Heister's *Heelkundige onderwyzingen enz.*, appeared. The same year Gentaku completed the manuscript of what may perhaps be considered the *summa* of his remarkable career as a *Rangakusha*, namely *Rangaku teiko* (Guide to Dutch studies). In this work he recorded the history of the spread and development of Dutch studies since the publication of his *Rangaku kaitei*. *Rangaku teiko*,

though relatively little known since it was never published, compares very favourably in the extent of its coverage and in its specificity to Sugita Gempaku's *Rangaku kotohajime*.

The origin of the official translation bureau,¹⁷ the Banshowagegoyo (Foreign books and documents translation bureau)¹⁸ to which Otsuki Gentaku received an appointment in 1811, was in accordance with a proposal to the Bakufu by Takahashi Kageyasu, who served as director of the Edo observatory from 1804 to 1828. The logic of Kageyasu's recommendation can be traced to the work done at the calendrical bureau on the astronomy book of Lalande in 1803 and 1804, and after that to the translation during the next few years of materials from various maps of the world. At its inception the principal tasks of the Banshowagegoyo, located in the Edo observatory, were to be the management of foreign affairs, the translation of foreign books and interpreting for foreigners.

The direct impetus for the assumption of these new responsibilities by the Bakufu bureaucracy was the advent of Russian power, in particular the return of Japanese castaways by Russian ships. According to the preface of Gentaku's *Kankai ibun*, the castaways brought back from Russia a map of the world and one of Russia. In 1807, there was a government order to study these, and for this it was necessary to bring from Nagasaki a translator expert in Dutch. This was necessitated by the fact that the search for a fully competent Dutch scholar at Edo proved fruitless. Maeno Ryotaku and Yamamura Saisuke were dead. Katsuragawa Hoshu, as an official physician, could not be assigned to the calendar bureau. It was felt that the choice of Otsuki Gentaku was not appropriate for a translator of geographical materials. Finally the selection fell to the Nagasaki apprentice interpreter and pupil of Shizuki Tadao, Baba Sajuro, who had been given the name 'Abraham' by Hendrik Doeff during Sajuro's study of Dutch with him. In 1808 at the age of 22, Sajuro, having received orders from the Bakufu, left Nagasaki and came to Edo, where he went to work alongside the *tenmonkata*.

With Baba translating,¹⁹ the work of revising and enlarging maps of the world progressed apace, and in 1809, with Nagata Zenkichi (Aodo Denzen) (1748–1822) doing the copper plates, a few sample copies were published. Aodo (the Hall of Asia and Europe) from Sukagawa in Iwashiro early showed himself skilful in sketching and was sent to Edo at the order of his daimyo. He studied with Shiba Kokan and in 1799 went to Nagasaki where he learned copper-plate etching from

the Dutch. Among the trial publications at the Banshowagegoyo were *Shinsen sokai zenzu* (Newly cut map of the world) and *Nipponhenkai ryakuzu* (Sketch map of Japan) (1809) which was attributed to Takahashi Kageyasu with an epilogue by Otsuki Gentaku. Since these were merely samples, in 1810, the very detailed and very accurate *Shintei bankoku zenzu* (Newly revised map of the world), based on a map by the English geographer Aaron Arrowsmith (1750–1823) and using the geography books of Johannes Hübner (1668–1731), appeared under the name of Takahashi Kageyasu and Hazama Shigetomi with copper plates by Aodo.

During these years Takahashi Kageyasu and Baba Sajuro made several other translations at the calendar office. Kageyasu did a translation of a part of Kaempfer's journal of his trip to Japan (1808) plus a book about Karafuto entitled *Hokui kosho* (Investigation of northern savages) (1809). In 1809, Sajuro produced *Ezo zakki* (Hokkaido miscellany) and *Teishaku Roshia kokushi* (Record of the imperial peerage of Russia.)²⁰ In 1808, in addition to Baba, Motoki Shoei (Shozaemon) (Rantei) (1767–1822) of the Nagasaki interpreter family had come to Edo to assist in the translation work at the observatory. Among his works were *Kaigun hojutsu biyo* (Notes on naval gunnery) and *Oranda gunkan zukai korei* (Illustration of an explanatory diagram of a Dutch warship). But at the end of 1808, Rantei left Edo and went back to Nagasaki to stay.

Thus, the calendar office came to be concerned with diverse translations which were not directly related to its meteorological functions. In December 1808, an order came from the Bakufu placing the astronomers in charge of Dutch books and requesting the names of all those who could translate. Gradually the scope of the translators was widened – an unavoidable trend concurrent with the mounting external pressures. This development also transferred the scene of the conduct of foreign relations and of the acquisition of knowledge of foreign countries once and for all from Nagasaki to the observatory at Edo. The translation bureau assumed a permanent character with the order from the eleventh Shogun Ienari (1773–1841) in March 1811 for the translation of the Dutch version of the *Dictionnaire oeconomique*²¹ by the French compiler Noel Chomel (1632–1712), with extensive emendations and supplements by Jacques Alexandre de Chalmot (1734–1801), bookseller, printer and writer.²² Baba Sajuro was put in charge of it. Just as the translation of *Kaitai shinsho* and of *Seijutsu hongen taiyo kyuri ryokai shinsei tenchi nikyu yohoki* had changed Dutch

studies from a 'curiosity' or a 'fad' into a serious academic undertaking by trained scholars, so did the decision of the Bakufu to sponsor the translation of Chomel move *Rangaku* into the realm of an officially sponsored and approved area of investigation.

Chomel, the curé of Saint Vincent at Lyons, France, wrote the *Dictionnaire oeconomique*, which was first published in French at Lyons in two volumes, in 1709. His original work was later supplemented and published in a second edition at Lyon in 1718. It was published in Paris in 1732 and again in 1763 in a three-volume edition. The book was translated into English and Dutch and went through editions at London (1725), Amsterdam and Leiden (1743), and then was republished once more in Paris in 1767. The contents of this eighteenth-century encyclopedia were similar to the American *Farmer's Almanac*. It was illustrated throughout and included the following: the most successful methods of improving estates and of preserving health; the most advantageous ways of breeding, feeding and ordering all sorts of domestic animals; the different kinds of nets, snares and engines for fish, birds and game; rules, directions and discoveries relating to gardening, husbandry, soils, manures, drugs, dyes and herbs; means of manufacturing soap and starch and of spinning cotton thread; methods for destroying vermin and other animals injurious to gardening and husbandry; weights, measures, metals and minerals; rural sports and exercises.

The first Dutch translation of Chomel's *Dictionnaire* was done by Jan Lodewijk Schuer of Gouda and was published jointly by S. Luchtmans of Leiden and Urtwerf of Amsterdam in 1743. When de Chalmot decided to reprint the 1743 version, being critical of the earlier translation and of numerous omissions in the Dutch text, he determined to revise the text extensively and to make a number of additions.²³ In particular, de Chalmot wished to emphasize new information on minerals, plants and animals. The revisions took him some ten years, and he relied on a fascinating variety of sources.²⁴

Among those who assisted de Chalmot were J. J. Knoop (b. 1700), horticulturist to Princess Maria Louisa of Hessen-Kassel, who wrote the sections on herbs, plants, trees, orchards, woods and gardens in the letters A to about R, as well as the material on 'Mathematics' and 'Mechanics'; the pathologist and zoologist Petrus Camper (1722–89) and the Lutheran minister and writer Augustus Sterk (1748–1815). De Chalmot himself utilized material from the renowned *Encyclopédie* or *Dictionnaire universel raisonné des connoissances humaines* for the

entries on morals, philosophy, jurisprudence and 'Arts and Sciences', but he avoided attacks on Christianity. For data on factories and manufactures, he borrowed from the Neufchâtel edition of *Description des arts et métiers*. The 1778 edition of Chomel consisted of seven volumes as compared with the original 1743 Dutch edition in two volumes, and between 1786 and 1793 de Chalmot published nine substantial supplementary volumes.

There were apparently several copies of Chomel in Japan, and reference to it was made in both Gentaku's *Rangaku kaitei* and Churyo's *Komo zatsurwa*. In 1810, one copy was purchased by the Bakufu from the personal library of Hendrik Doeff for 6 silver *momme*, and this is most likely the book the translation of which was begun the next year.²⁵ The Japanese translation was given the name *Kosei shimpun* (New volumes for the public welfare). At the beginning of this project, in June 1811, Otsuki Gentaku was assigned to join Baba Sajuro and received a written appointment from the shogunate.

The effort to translate the de Chalmot edition of Chomel was the largest single such undertaking of the Bakufu. Japanese records indicate that the translation was still in progress as late as 1845, and the work was never finished nor was it published until 1937 when, as a bibliophilic curiosity, 135 extant manuscript sections, or roughly half of de Chalmot, were printed. Selected entries from the letters A through S plus the entry on 'wine' from the letter W had been translated by the Banshowagegoyo. Matters of special interest to the shogunate and chosen for translation included animals, plants, pharmacopoeia, medical care, industry, handicrafts and minerals (gold, silver, copper, steel, tin, zinc, quicksilver). In addition, extensive notes of the translators were often added.

Three manuscript copies of each translated section were made, and, while these were not printed, they seem to have circulated fairly widely among the *Rangakusha* at Edo. Naturally, this was facilitated by the coming together in and around the Banshowagegoyo of those same Dutch scholars. Moreover, the nature of the material selected for translation was overwhelmingly in the category of applied technology and thus corresponded to the kinds of concerns pursued by the great majority of those Japanese who interested themselves in information from the West.

In the move of the Bakufu of ordering the translation of the *Kosei shimpun* in 1811 can be found the basis for Japan's future Ministry of Foreign Affairs. The original announced purpose of the

establishment of the bureau was the improvement of the public welfare, but, as foreign affairs became more pressing, the result was the diminution of the 'public welfare' aspect and the assumption of a greater political and military purpose. The number of translator personnel was continuously increased and in addition to *Kosei shimpén* works on military science, geography and foreign affairs were assigned to the Banshowagegoyo for translation. Not only did this greatly augment the information-gathering of the Tokugawa shogunate, but it also provided the government with a practical monopoly of Dutch learning by attracting at one time or another to the translation office nearly all of the outstanding Dutch scholars of the first half of the nineteenth century.²⁶ There is good reason to presume that this was exactly what Otsuki Gentaku visualized in co-operating in the formation of a central translation agency under the direct aegis of the Edo authorities. Moreover, the very long period of continued Bakufu support for the translation of Chomel is indicative of the great importance which the shogunate attached to the practical information contained in the de Chalmot version.

From the standpoint of the history of Dutch studies in Japan, the establishment of the Banshowagegoyo in order to undertake the work on Chomel²⁷ joined together under Bakufu auspices the two streams of prior *Rangaku*, medical and astronomical, as well as the two prior principal sites of the acquisition of knowledge from Western sources, Edo and Nagasaki. Otsuki Gentaku and Baba Sajuro, respectively, were certainly the most outstanding representatives of the two traditions and the two locales at the time *Kosei shimpén* was begun.

When one views the tremendous intellectual achievement of a man like Gentaku, it is perhaps difficult to understand his idea that the Bakufu should maintain strict control of Dutch learning. However, he was himself a direct product of the feudal system and had acquired his own knowledge of the Dutch language with the assistance of feudal authorities. For a man of Gentaku's background, his appointment to the post as official translator in 1811 was exalted recognition of his accomplishments as a scholar of things Western. Further, the services of Gentaku and his fellow experts were necessarily of greatest value to the government at Edo or to the feudal daimyo. And these scholars required financial support for their work, and, no doubt even more, they needed a favourable climate in which to pursue their studies. Thus by making themselves available to the authorities, they attained

personal recognition for themselves as well as nurture and protection for their research.

Nevertheless, despite Gentaku's apparent desire for shogunal control of Dutch learning, it was his private school, Shirando, that was actually the mecca for the leading students of Dutch studies from its founding in 1789 until his death in 1827. In the paragraphs that follow some of the more significant among the pupils of Gentaku will be discussed, and their important scholarly contributions will be described. In addition, since Otsuki Gentaku's influence extended beyond his students to his students' students, where appropriate, reference to their activities will be made as well.

Hashimoto Sokichi (Donsai) (1763–1836) from Osaka originally earned his livelihood drawing crests on umbrellas. In 1788 with the financial assistance of the *chonin* Nakajimaya Kishiro and the patronage of Hazama Shigetomi and Koishi Genshun²⁸ (1743–1808), Sokichi went to Edo to study with Gentaku and made remarkable progress. Subsequently, Sokichi was said to have been the first Dutch scholar at Osaka where he opened a not especially profitable medical practice, but where also, in 1801, he opened a private school, Shirando, in which he taught Dutch studies.

Sokichi was known particularly for his studies of electricity, which he based on a copy of the ten-volume *Nieuw en volkomen woordenboek van kunsten en wetenschappen* by Egbert Buys (d. 1769) published at Amsterdam (1769–78). Among Sokichi's many writings were: *Oranda shinyaku chikyu zenzu* (New translation from Dutch of a map of the world) (1796); *Oranda shisei erekiteru kyurigen* (Investigation of the origin of the natural principles of the Dutch system of electricity); *Sanhohoten* (Handbook of the three methods [phlebotomy, emetics, opium]) (published 1805 and 1813) which had a preface by Otsuki Gentaku and which was based on *Pharmacopoea Galeno-Chemico-Medica*²⁹ by Wouter van Lis; *Taisei honzo* (Botany of the West) (1819); *Seiyo iji shusei hokan* (Treasure chest of collected Western medical facts) (partly published in 1819 and 1827), which was derived from the Dutch translation of Joh. Jac. Woyt's *Gazophylacium medico-physicum* . . . and included information on 1,504 drugs and 385 diseases.³⁰ Sokichi also may have been responsible for *Seisetsu san'iku shujutsu zensho* (Complete book of Western obstetrical surgery) based on the 1759 revised translation into Dutch³¹ by Petrus Camper of the 1668 French original on the illnesses of pregnant women by François Mauriceau (1637–1709).

Udagawa Genzui (Kaien) (1755–97), physician at Edo to the daimyo of Tsuyama, was originally a follower of Chinese medicine, but in the introduction of his *Seisetsu naika senyo* (Selected points of Western theories on internal medicine) (1793–1810), which was a translation of Johannes de Gorter's (1689–1762) *Gezuiverde geneeskunst, of kort onderwijs der meeste inwendige ziekten ten nutte van chirurgijns*, Amsterdam, 1744, Genzui wrote:

One day I was told of European medicine. I rejected those theories obstinately and spoke evil of it, without studying the good and the evil. Later I was introduced to Katsuragawa Hoshu. . . . There I met Otsuki Gentaku who studied with Maeno Ranka. Besides, I made the acquaintance of Nakagawa, Sugita, and friends of theirs. I profited largely from this intercourse and regretted my former obstinacy. I sighed: 'I have been mistaken. Medicine is an art that does a great deal of good and however studied does not matter, as long as it has the aim in view to cure.' Professor Otsuki is the leader of a group of students of Dutch science. I love him as my brother and respect him as my teacher.³²

The same year, 1793, the Bakufu, as noted in chapter IX, officially recognized Western surgery by the appointment of Katsuragawa Hoshu as a teacher in the Igakkan (Official Medical School). When Genzui published his translation of de Gorter as the first Japanese textbook on Western internal medicine, it contained prefaces by both Katsuragawa Hoshu and Taki Mototaka, the Bakufu Chinese-style physician. Nevertheless, though surgery which had a long history in Japanese medical annals was given official recognition, Western internal medicine was not sanctioned by the Bakufu until 1858. Yet outside the immediate purview of the authorities Dutch-style internal medicine was being studied.

Genzui, in addition to his *Seisetsu naika senyo*, wrote two other medical works, *Tozai byoko* (Treatise on sickness in the Orient and Occident) and *Seiyo igen* (Discussion of Western medicine), one botanical treatise, *Nylandt somokuryaku* (An abbreviated translation of Nylandt's botany) (1797),³³ and *Ranyakubenmo* (Details for understanding and translating Dutch) (1793). Perhaps Genzui's most important contribution was the conversion to Dutch-style medical science of Yasuoka Genshin (Shinsai) (1769–1834) who after Genzui's death was named his successor and assumed the same family name, Udagawa.

Genshin became a convert to Western leaning in 1790 when he came to Edo from his native Ise and showed to Genzui a commentary

that he had written on a standard Chinese medical text. Genzui merely glanced at the title and returned the book at once to its author. The story is told that Genzui said that Chinese medical books were of no value, and, when Genshin asked what was to be consulted for the treatment of sick people, Genzui explained the European method of medical care and said, 'Every organ of the human body has its own function. When we do not know this function, we cannot determine the cause of the disease and prescribe medicines.'³⁴ Whereupon Genshin was so impressed by what he had heard that he threw away his manuscript and asked Genzui to accept him as a pupil. It was also through Genzui that Genshin was enabled to study under Otsuki Gentaku. Genshin's scholarly prowess was officially recognized when in 1813 he was invited to join the Banshowagegoyo to work on the translation of Chomel.

That Genshin was an apt and eager pupil can be discerned from a perusal of his many writings. In 1793, he contributed an introduction to his adopted father's *Ranyakubenmo* in which he praised the book as a remarkable guide for those studying the Dutch language. Genshin himself compiled *Ensei ihan* (Examples from Western medicine), and in 1805 he published a summary of the same work entitled simply *Ihan teiko* (Medical examples in outline). Then in 1808 Genshin produced *Ihan teiko* in a revised version, a volume which concentrated on the composition and function of the human organs and was accompanied by fifty-two copper-plate etchings reproduced by Aodo Denzen from Stephen Blankaart's *De nieuwe hervormde anatomie*. In preparing this work Genshin, in addition to Blankaart, had used several other European pathology books: *Heelkonstige ontleeding van 's menschen lighaam* by Jan Palfijn; *Anatomia corporis humani* by Philippe Verheyen (1648–1710); the Dutch translation of *Exposition de la structure du corps humain* by Jacques-Benigne Winslow (1669–1760). Then, in 1822, Genshin published a new edition of the de Gorter translation of Genzui under the title *Zohojutei naika senyo* (*Naika senyo*, revised and enlarged).

Genshin was also probably Japan's first true pharmacologist, and in this capacity he translated *Oranda kyokuho* (Dutch pharmacopoeia about 1805). This was almost a complete version of *Pharmacopoea hodierna*³⁵ by P. van Hamel published in Utrecht in 1719. Two subsequent works by Genshin which added greatly to the Japanese acquaintance with Western pharmacopoeia were *Oranda yakkyo* (Mirror of Dutch medicines) (1820; revised and enlarged 1828–35)

and *Ensei ihomeibutsuko* (Treatise on Western medicaments) (1822–5; revised and enlarged 1833–4).³⁶

The revised edition of *Ensei ihomeibutsuko* provided the first publication of modern Western chemical theory in Japan in accordance with the work of Antoine Lavoisier (1743–94) although the name of Lavoisier did not itself appear. Genshin, like his predecessors, translated chemistry as *seiyaku* or ‘pharmacy’, indicating that chemistry was considered a branch of medicine. Chemistry as a separate science was not to be fully known in Japan until the translations of Udagawa Yoan began to circulate.

Genshin has also been called the founder of paediatrics in Japan by virtue of his manuscript translation of *Hendleiding tot de kennis en geneezing van de ziekten der kinderen*. The Dutch book was itself a translation from the Swedish original by Nils Rosen von Rosenstein (1706–73) which had been published in Stockholm in 1764. Genshin worked with the second Dutch edition (1779) translated by the outstanding Leiden pathologist Eduard Sandifort (1742–1814). In Japan the work was entitled *Shonishobyō kampo chihozensho* (Complete book of the methods of curing various children’s illnesses).

Genshin also pioneered in the field of eye diseases. His unpublished translation, *Taisei gankazensho* (Complete book of Western ophthalmology) (1799), was of Mart. Pruijs’s *Verhandeling over de oogziekten* (Rotterdam, 1787). Again, the work by Pruijs was itself a translation, in this instance from the Latin *Doctrina de morbis ocularum* (Vienna, 1777) by the remarkable J. J. E. Plenck.

Unpublished manuscripts of Genshin literally abound. In addition to translating writings of Heister, van Swieten, Consbruch and Hufeland, Genshin translated Christianus Johannes Nieuwenhuys (1773–1837) on cinchona, and the Dutch version by Lambertus Bicker (1732–1801) of the Swiss physician Simon André Tissot (1728–97) on lung inflammation. Manuscripts also exist of partial translations into Japanese of the Dutch translation by G. J. Pool (1787–1854) of C. K. Sprengel’s (1750–1816) Latin original *Therapia generalis* and of another Dutch translation of a volume by the German H. G. Marshall on women’s ailments.

Genshin was the first among the Western-style Japanese physicians to recognize the importance in the history of Western medicine of the work of Herman Boerhaave when he found the latter mentioned with awe and respect in books by van Swieten³⁷ and von Rosenstein, who had both studied under Boerhaave. Genshin wanted very much,

therefore, to translate Boerhaave but after being recruited to the Chomel project in 1813, he was obligated to turn the task over to his disciples. Thus, by the peculiar happenstances of fate and time, the Japanese medical world had to wait still longer to benefit at first hand from the seminal teachings of Boerhaave which were already then over a century old.

Udagawa Genshin's adopted son Udagawa Yoan (1798–1846), given the name 'Botanicus' by von Siebold whom he met at Edo in 1826, was the fifth generation of Udagawas to serve as physicians to the Tsuyama daimyo. Yoan became the heir to his father's impressive tradition of Dutch learning and may also be considered a representative of the intellectual heritage of Otsuki Gentaku. Yoan began the study of Dutch at the age of 16 and numbered among his teachers Baba Sajuro, Yoshio Shunzo and Yoshio Chujiro.

Yoan was the first scholar to use the modern term for botany, *shokubutsugaku*, and also was responsible for the introduction into Japan of the system of plant genealogy of the famed Swedish botanist Carl von Linne (Linnaeus) (1707–78) whose classifications had been translated into Dutch by Martinus Houttuyn. Yoan published two works on botany: *Botanikakyo* (The sutra of botany) (1822) and *Shokugaku keigen* (Introduction to the study of plants) (1835).

Botanikakyo sought to explain Western botany as though reciting a Buddhist sutra. The work was based on the article on botany contained in Egbert Buys, *Nieuw en volkomen woordenboek van konsten en wetenschappen; bevattende alle de takken der nuttige kennis . . .* (10dln, Amsterdam, 1769–78). *Shokugaku keigen* was based principally on the 1817 Utrecht edition of *Natuurkundige uitspanningen, behelzende eene beschrijving, van meer dan vier hondert planten en insekten, keuring naar het leven afgebeeld*. The Dutch author was Job Baster (1711–75), physician, biologist, zoologist, botanist, and student of Boerhaave. In *Shokugaku keigen* Yoan set forth the Linnean taxonomy of plants, and in 1835 he completed the manuscript for *Dogaku keigenko* (Draft of the introduction of zoology) which was to introduce to the Japanese the Linnaean classifications of animals and insects.

Perhaps Yoan's best-known published work is *Seimi kaiso* (Foundations of chemistry) which appeared first in 1837. It was this book which truly established chemistry in Japan as an independent science. The word *seimi* itself was simply a phonetic transcription with two Chinese characters of the Dutch word *chemie*. Although frequent mention is made of Lavoisier, *Seimi kaiso* is not based on the 1800

Dutch translation of Antoine Lavoisier's *Traité élémentaire de chimie* (1789) but on Adolph Ypey's expanded Dutch translation, *Chemie voor de beginnende liefhebbers* (1803), of the German translation by J. B. Trommsdorf (1770–1837) of the second edition of *An Epitome of Chemistry* by William Henry (1774–1836), the English chemist known as the discoverer of Henry's law.

Seimi kaiso was written like a textbook, mentioning in the preface twenty-four Dutch works which were used as references in addition to the Ypey translation of Henry.³⁸ Yoan certainly was familiar with Lavoisier since drafts of his translation of the *Traité* have been found among his manuscripts, and he listed the Dutch translation published in 1800 among his references. Even the nomenclature which Yoan devised for chemical terminology in Japanese followed the Lavoisier philosophy of naming elements.

Given the importance of *Seimi kaiso* to the development of Japanese science, an importance which undoubtedly Yoan himself recognized, the problem remains as to why he chose to publish the translation of Henry in preference to the seemingly more obvious choice of Lavoisier. Of course, the answer can only be based on speculation because of the lack of hard evidence. Eikoh Shimao has suggested that Henry was easier for beginners and was, therefore, more appropriate for the sort of textbook Yoan was writing.³⁹ There may be more obscure or more subtle reasons as well. For example, since translation took as long as it did, perhaps Henry was more viable in that context than Lavoisier. In the same regard, since it is not known exactly when the Dutch versions of Lavoisier and Henry respectively came into Yoan's hands, one cannot be entirely sure which he decided to tackle first or which influenced him the most. In fact, as has been seen earlier in the case of Newton and of Boerhaave, it was not their original works which were translated into Japanese by the *Rangakusha* but rather works which explicated the as yet untranslated original texts.

Apparently the principal stimulus to Udagawa Yoan's interest in such fields as botany, chemistry and zoology, beyond the obvious fact of the inheritance of his father's intellectual tradition, was his exposure to certain of the translated portions of Chomel's encyclopedia. He seems to have encountered these for the first time about 1817 although he himself did not actually join in the Chomel project at the Banshowagegoyo until 1826. Moreover, Yoan's desire to improve medical techniques and medicinal treatments led him to recognize that botany, chemistry and zoology were all pertinent to his ultimate

goal, once he understood from his reading of Chomel what these disciplines were.

In fact, Yoan seems to have wished to introduce all of Western natural science into Japan. It was Yoan, for example, who first introduced entomology in his *Konchu tsuron* (Treatise on entomology) (1828), again based on an entry in Chomel. Also, among Yoan's manuscripts have been discovered drafts of writings on spas, coffee, Epsom salts, various Western herbs, mathematics, linguistics (Yoan dabbled in English, Russian, Latin and Greek) and Western music and painting.

Yoan even investigated those Western societies where this knowledge evolved in such unpublished works as *Seiyokinenko* (Draft of a chronology of the West) (1838) and *Oranda shiryaku* (Brief record of Holland) (1844–5). However, despite all his remarkable credentials as a *Rangakusha*, Yoan was, like his father and Otsuki Gentaku before him, a committed Confucian scholar, devoted first and foremost to the classical Chinese intellectual heritage of Japan. For in the case of a man like Yoan, aspiring to succeed his father as a *han* physician, whatever additional facets of Dutch-style medicine he may have acquired, his future could only be assured by a traditional foundation in Chinese-style medicine. And his standing in his own society, even though it might be theoretically enhanced by the knowledge of certain Western skills, necessitated deeply implanted and regularly reiterated Confucian scholarly roots.

It was another of Udagawa Genshin's disciples, Iinuma Nagayori (1782–1865), who wrote one of the so-called three great works of Japanese botany, all of which were based upon Western theory.⁴⁰ Nagayori's was *Somoku zusetsu* (Illustrated explanation of botany) (1856–62) while the other two were *Honzo zufu* (Diagrams and chronicles of botany) (1828) by Iwaishi Tsunemasa (1786–1842) and *Honzo komoku keimo* (General classification of botany for beginners) (1830–11) by Ono Motohiro (Ranzan) (1729–1810), considered by many Japanese writers as the Linnaeus of Japan.

Among Otsuki Gentaku's pupils had also been the aforementioned Yamamura Saisuke whose revised and enlarged version of *Sairan igen* had a preface contributed by Gentaku. Saisuke is said to have consulted a total of 126 works to prepare his new version of *Sairan igen*: 32 Western books, 42 Chinese books and 52 Japanese books.⁴¹ Saisuke, like several of his peers, also wrote a treatise dealing with Russia: *Roshia kokushi* (Record of Russia) (1806–9).

The part played by Otsuki Gentaku in the publication of the *Haruma wage*⁴² (Halma dictionary) in 1796 is perhaps best described in his own preface to that work:

Thirty years ago a Dutch interpreter at Nagasaki, Nishi Zenzaburo, as the first student of this same endeavour tried to translate Marin's dictionary; referring to his manuscript it can be seen that he translated only the first two or three sections; later Maeno Ryotaku also tried to compile this book of translated words . . . but did not complete this work; and a physician from Inaba, Inamura Sampaku [Unagami Zuio (1759–1811)], appreciating this study undertook the endeavour; he had received Western learning from me seven or eight years earlier at the capital, but there was a period when his lord required his services; with the passing of the days and months he knew he could not complete this work and bringing the translated words of his dictionary to me . . . he begged me to assume the translation. I had said from the beginning that I could not carry out this project from lack of talent and interest, and, since I demonstrated these two known facts, therefore the work was put off from day to day. I became friends for the first time with Ishii Tsuneuemon (Shosuke) [b. 1743], a retainer of the Shirakawa family and the former Nagasaki interpreter, on the way back to the capital from my study at Nagasaki. On the way, there was talk of his plans for taking up Nishi's work; I also said that I wanted this writing continued, and that at first, when Sampaku encouraged me, for various reasons I refused again and again. Moreover after our conversation I reported [to Sampaku] that Ishii already had this intention; Sampaku, overjoyed, begged to consult with Ishii; for this I entreated with Ishii and had him go to Sampaku. Under Sampaku he took up this work, and I encouraged Udagawa Genzui and Okada Hosetsu to get in touch with them. Ishii agreed to this and asked them to join forces. Accordingly, the companions planned together and often coming to and from their school they wrote down words. Before long Ishii attended his lord at Shirakawa, and Sampaku asked me for the original text of my Halma and entrusted it to Ishii. Ishii took this to his native place and finally completed the work; the following year [June 1785] he returned to Edo and collected all the work from Sampaku and the others; thereafter Sampaku, Udagawa Genshin, etc., corrected the work with Ishii and after a few years completed the entire book. Later Sampaku with a new purpose now printed the whole original Halma in movable type; he put alongside the translated words as they were heard; finally he made the several volumes [into which the work was divided]; after completing the whole book he gave me this copy and said that this is in good faith of its unforgettable origins. Acquiring this I put it in my library and for a short time entitled it *Tozai inkai* [Meeting of the sounds of East and West] and use it in the examination of translations, and I lend it to my pupils and followers in response to their inquiries; when they ask about its origin, [I say] that it was based on a happy marriage which began with my friendship with Ishii who was tutored by the teachings of myself and Maeno Ranka.⁴³

This Dutch–Japanese dictionary was known as both the *Haruma wage* and the *Edo haruma*. The work of compilation took thirteen

years and was completed on 18 February 1796.⁴⁴ Its primary source was *Nieuw Nederduitsch en Fransch woordenboek* (Amsterdam, 1717) by François Halma (1653–1722), a book dealer and publisher at Utrecht.⁴⁵ The work of Sampaku and his friends of which only thirty copies were printed is generally known as the *Edo Halma* in order to contrast it with the *Nagasaki Halma* or *Doeff Halma* (*Doyaku Haruma*) (Halma translated by Doeff) or *Dofu Haruma*. The work on this latter edition was done by the *opperhoofd* Hendrik Doeff (1777–1835) between 1811 and 1817 in consultation with many Nagasaki interpreters and was based on the second (1729) printing of Halma's Dutch–French dictionary. Doeff apparently undertook this labour in order to try to improve the skills of the Nagasaki interpreters with whose translation abilities he was highly dissatisfied.

The Japanese were especially impressed by the devotion of Doeff to this task and seem to have been awed by his unstinting efforts. When the Bakufu heard about Doeff's undertaking and asked for a copy of his work, Doeff requested a postponement of any required submission and, in turn, asked for assistance from the authorities. Immediately the shogunate ordered eleven interpreters to work with Doeff. Much of the subsequent work was done by two of these eleven in particular: Junior Interpreter Nakayama Tokujuro and Junior Interpreter Middle Grade Yoshio Gonnosuke (1785–1831). The completion of the dictionary took until 1833, long after Doeff left Japan (1817), but it was not actually published until 1855–8 when the Bakufu finally gave its permission.

Among Unagami Zuio's twenty-two disciples at Kyoto where he lectured on *Rangaku* in 1805 and 1806 was Fujibayashi Fuzan (Taisuke) (1781–1836) who became a leading *Rangakusha* in the old imperial capital. Since there were only thirty copies of the *Edo Halma* in existence and since it was a very bulky work which was being laboriously copied by hand by Dutch scholars all over Japan, in 1810 Fuzan published a hundred copies of a condensed version under the title *Yakken* (A key to translation). *Yakken* which was printed in movable type had the Dutch words arranged in alphabetical order and explained in Japanese. Fuzan's condensation contained about one-half the number of words (27,000) in the original and was about one-sixth of its bulk.⁴⁶ Subsequent second (1824) and third (1857) editions of Fuzan's work gave it a wide circulation and certainly the most currency of any Dutch–Japanese dictionary during the Tokugawa Period.

Fuzan was also the author of a detailed and systematic grammar of the Dutch language, *Oranda gohokai* (Understanding the rules of the Dutch language), published at Kyoto in 1815. Like *Yakken*, this work was published mechanically and had, accordingly, a significant impact. Also, like *Yakken*, *Oranda gohokai* was a very careful and scholarly effort and became perhaps the most influential Dutch grammar for the last generation of *Rangakusha*.

Fujibayashi Fuzan's linguistic abilities were also evident in the remarkable amount of translation work of his own which he accomplished in the field of medicine. His unpublished translations included medical texts by Blankaart, Kulmus, Plenck and Donald Monro (1727–1802) (*Verhandeling over de waterzugt en derzelver onderscheide soorten*, translated from English and annotated by J. B. Sandifort (b. 1745), Leiden (1772)). Fuzan's published medical translations and original writings encompassed *Oranda yakuseiben* (Understanding the characteristics of Western medicines) (1825) which reproduced chapters 1 to 8 of Adolph Ypey's *Handboek der materies medica, ofte aanwijzing der kentekenen en kragten der voornaamste geneesmiddelen* (Amsterdam, 1811); *Seiihosen* (Selected Western medical methods) (1828–9), said to be based on some 53 different Dutch medical books; and *Seiikonnichiho* (Western medical methods today) (1848).

Fuzan's closest associate was another Kyoto scholar-physician who also made a name for himself by his contributions in the field of Dutch-style medicine. Komori Tou (Genryo) (1782–1843) from Gifu was adopted at the age of 10 by his medical teacher, Komori Yoshiaki (1744–1804), from whom Tou learned first about Western medical methods. After studying with Unagami Zuio, Tou opened a medical practice in Kyoto in 1814. He and Fujibayashi became very close friends and co-operated in sharing books and in exchanging the results of various Dutch-style treatments. Based on the spread of his reputation, in 1820 Tou was appointed physician to the imperial court, probably the first *Rangakusha* to attain that position.

Tou produced three important published works which contributed meaningfully to the growing body of knowledge of Western medicine in late Tokugawa Japan: *Ranpo suki* (Principles of the Dutch style) (1817) based on Part 2 of the 1780 second printing of the Dutch translation of the then world-renowned *Domestic Medicine* (first printing, 1769) by the Scottish physician William Buchan (1729–1805); *Byoin seigi* (A full commentary on the sources of illness) (1827) which was not a translation but a textbook on pathology based on

Tou's lectures which evidenced the influence of Boerhaave; and *Taiseihokan* (Mirror of Western methods) (1829–34), a work for which Tou is supposed to have utilized 94 Dutch medical sources!⁴⁷

One remarkable Dutch scholar who had the unusual good fortune to study with Otsuki Gentaku at Edo, with Unagami Zuio at Kyoto and with Hashimoto Sokichi at Osaka was Naka Tenyu (Tamaki) (1783–1835). In addition, Tenyu had spent several months in Nagasaki pursuing Dutch studies there. Although Tenyu was a physician, it is for his work in physics, optical science, astronomy and mathematics that he is best remembered.

Tenyu joined together with Saito Hosaku to complete in 1822 at Kyoto *Palfijn kaibozu* (Palfijn's anatomical chart), a partial version of *Heelkonstige ontleding van 's menschen lighaam* (Leiden, 1718 and 1733) by the Flemish anatomist Jan Palfijn (1650–1730). This publication included plates reproduced from the original and engraved by Naka Isaburo (d. 1860), a nephew of Tenyu. This Japanese version of Palfijn's work included only the last four sections of the 1718 edition: the head, bones, muscles and vessels. The translation of the first three sections was promised for 1824 but never appeared.

Though one can only speculate on the coincidence, 1824 was, in fact, the year that what many scholars consider to be a most important work, *Inritsu* (On attraction), appeared. Tenyu had apparently become more and more engrossed in the study of Western physics, believing in its significance as providing a basis for the further study of Western medicine. Thus, it is not unlikely that the demands and the complexities of the task involved in *Inritsu* led to the postponement of further work on Palfijn.

Some fifteen years earlier, Zuio had turned over to Tenyu both the Dutch original (Lulofs's translation) of Keill's paper which had appeared in the *Philosophical Transactions* of 1708 and Shizuki Tadao's translation of Keill, *Kyuryokuhoron* (Essay on the law of attraction) (1784). According to Tenyu's own preface to *Inritsu*, Zuio had stressed the importance of Tadao's work and the need for a revised translation but had said that he (Zuio) was too old to undertake such a task. Thus, the responsibility was passed on from *sensei* to *deshi*, and, in the Japanese scheme of things, Tenyu had an obligation to do the work. *Inritsu* had been hanging over Tenyu's head, so to speak, ever since Zuio had first passed *Kyuryokuhoron* to him.

Tenyu more than did his duty to his teacher. For not only did he produce *Inritsu*, but he also wrote on his own *Inritsu teiji* (*Inritsu*

explained). The latter treatise was not a translation but rather was an attempt by Tenyu to impart his own understanding of Western physics as a result of his having worked on the revised translation. Here, Tenyu's most impressive innovation was to develop a concept paralleling Newtonian transduction by advocating 'the legitimacy of generalization by the inference of what is beyond sense experience from what is within sense experience. . .'.⁴⁸ Accordingly, Tenyu flatly denied the traditional Chinese *yin* and *yang* and five elements theories, and in this regard went beyond Shizuki Tadao. Nevertheless, lacking mathematical skills, neither Tenyu nor those scholars among whom his manuscript circulated were able to go on to develop a full understanding of modern Western physics.

There are two other *Rangakusha* who, although they did not study directly under Otsuki Gentaku, were greatly influenced by him and must be mentioned. They are Ema Shunrei (Ransai) (1747-1838) and Tsuji Norinobu (Ranshitsu) (1756-1835). Ema Shunrei studied Dutch-style medicine at Edo with Maeno Ryotaku from 1792 to 1795 and in 1794 became a member of the Shingenkai (New foundation society), a group of Dutch scholars who met at Otsuki Gentaku's Shirando. Tsuji Norinobu, though he apparently never met Otsuki Gentaku, learned the Dutch language from his study of *Rangaku kaitei*.

Shunrei had followed in the footsteps of his adopted father by being named *han* physician of Ogaki *han* at his stepfather's death in 1774, and his pursuit of Dutch medical knowledge was with the permission of his *daimyo*. Shunrei published two translations of works by the Rotterdam physician Henricus Buyzen: *Goeki shimpo* (Methods of diagnosing the five liquids [urine, stool, perspiration, saliva, vomit]⁴⁹ (1816); *Oranda ihosanyo* (Essentials of Dutch-style medicine) (1817) which while not an exact translation was arranged in the same way as *Practyk der medicine*.⁵⁰

Norinobu, adopted into the Tsuji family of hereditary physicians, was a retainer of the Kuga family at Kyoto where he was one of the earlier *Rangakusha*. Norinobu is best known for his scholarly interests in linguistics and in the natural sciences. His eagerness to learn the Dutch language was particularly stimulated by his fellow Kyotoite, Koishi Genshun. Since the latter could not himself read Dutch, he was especially encouraging to Norinobu. It is said that Norinobu's knowledge of Dutch was so outstanding that he could eventually write original poems in Dutch. He also took up the study of Russian,

Malay, Greek, Korean and Pali. In the sciences, in addition to his work in pharmaceuticals, Norinobu investigated astronomy, geography and calendrical science.

His principal written work is the published *Rango hassan* (Eight papers on the Dutch language) (1795) which was an encyclopedic dictionary of information concerning the Netherlands covering such subjects as astronomy, geography, religion, utensils, means for defence, medicines, commerce, economy, art, foreign tools, the human body, animals, plants, languages and measures.

Through this extensive discussion of Otsuki Gentaku, his disciples and their followers, one should be able better to comprehend the importance of such a leading scholar of Dutch studies in Tokugawa Japan. His work and influence is highly significant in that it reveals an advanced stage in the overall development of *Rangaku*. In Gentaku's lifetime a new point had been reached in the chronological progression of Western learning from the interpreters in the mid-seventeenth century to the establishment of a Bakufu translation bureau and to the writing of serviceable dictionaries for Japanese scholars of Dutch who now began to appear throughout the country. The scope of Gentaku's accomplishments ranged from language studies through the natural sciences, bringing to bear on all who came in contact with him, with his pupils, or with his writings both direct and indirect influences favourable not only to the achievements of the West but to its methods as well.

Nevertheless, the real extent of the impact of such influences on the basic *Weltanschauung* of the *Rangakusha* was limited. For despite the evident increase of information from the West that was becoming available in Japan, that information was partial, generally lacking in a theoretical framework, and usually affected by a time-lag varying widely and arbitrarily. In short, even the augmented knowledge from Europe which characterized Gentaku's era was insufficient, given the prevailing intellectual climate in Tokugawa Japan, to permit those scholars who devoted talent, time and energy to Dutch studies to view *Rangaku* as more than a 'technique' to fill in those gaps where established and accepted knowledge was somehow lacking.

Further, whatever their level of knowledge of the West, Dutch studies specialists did not diminish their allegiance to traditional Confucian principles. Dependent as they were on officials for their protection and sustenance, it is not surprising that the *Rangakusha* continued to be outspoken in their allegiance to Confucian values and

Confucian education. Otsuki Gentaku himself told his son to master the Chinese classics because, according to Gentaku, it was necessary to know Chinese in order to translate Dutch accurately. Similarly, Gentaku wrote that while there were many excellent remedies to be found in Western medicine, Chinese-based traditional medicine must never be abandoned.

Thus, through the superb contributions of Otsuki Gentaku and his many disciples, *Rangaku* enlarged its scope greatly. Nevertheless, there was a concurrent tightening of Bakufu control of Dutch studies, facilitated by the establishment of the Bانشowagegoyo. Moreover, despite the obvious importance in so many areas of the specific data and technology which were being obtained from the West, not only the officials but the very scholars themselves who were 'discovering' this new information remained relatively unaffected in their basic intellectual outlook and retained their Confucian ethos relatively intact.

XII

Western learning in various domains

Having traced the spread of *Rangaku* during the Tokugawa Period from its beginnings among the interpreters to its development at Edo in the late eighteenth century and through the establishment of the Translation Bureau in the early nineteenth century, it is now necessary to consider two important phenomena in the decades just prior to the arrival of Perry. These are the rise of Western learning in the various *han* and the study of European scholarship in a number of private schools. This chapter will be devoted to the former phase and the next to the latter.

As has been seen throughout the previous chapters, the provinces of Japan supplied a steady stream of scholars for the investigation of Dutch studies first at Nagasaki and later at the capital. It is evident that many of these men made their influence felt in their home areas either by returning to their native places after study or by consultation with their local daimyo on one of the daimyo's regular journeys to Edo. Thus by personal contact and by means of the increasing number of publications, information from the West came to be known in a great number of domains. However, the real impetus for serious investigation of *Rangaku* on the *han* level came in the nineteenth century under the impact of the increasingly serious foreign problem – British and later American incursions were added to the Russian – and also of the precarious economic situation which in the absence of firm action by the central government was being dealt with more and more by the individual domains themselves.

In almost every case Western learning in the *han* was stimulated by the presence of an interested daimyo. Only a minority of these were simply curious men wanting to engage in a bit of diletantism. By far the greater portion of those daimyo who sponsored Western scholarship intended to employ this knowledge to improve conditions in two very practical directions: defence and technology. The upturn in military preparation was an obvious result of foreign incursions which forced the Bakufu to relax its military controls and to encourage the daimyo to augment local defences. Technological innovation not only

was a necessary counterpart to any military build-up, but was viewed by many forward-looking daimyo as a possible answer to their severe economic problems. In this latter regard one finds numerous attempts to improve and diversify agriculture, to develop natural resources, to introduce industrial enterprise, to better health conditions and even to reclaim land. Thus, although the daimyo was the stimulus for the growth of Western learning within the domains, the actual pursuit of such knowledge was principally undertaken by the lower *bushi*. Therefore, it is important to examine Western studies in several of the *han* in order to gauge the scope of these local activities in the overall picture of Dutch studies in Japan.

Until the time of Shogun Yoshimune there seem to have been few instances of daimyo-encouraged Western learning outside the narrowly prescribed fields of medicine and gunnery. However, when Yoshimune encouraged Aoki and Noro to take up Dutch studies, this act had its effect in the several domains. Reference has already been made to the accomplishments of such physicians as Sugita Gempaku, Maeno Ryotaku, Takebe Seian, Otsuki Gentaku, Udagawa Genzui and Inamura Sampaku – all of whom worked under the sponsorship of their respective daimyo. Mention has also been made of Kuchiki Masatsuna, daimyo of Fukuchiyama, who was himself a leading *Rangakusha*. While it would be impossible to detail within the scope of this volume all the advances in European knowledge made at the *han* level, an effort will be made in the following paragraphs to describe the development of Western learning in several of the more important domains.

Matsushiro

In the early Tokugawa Period the Matsushiro domain had been ordered to study the terrain of the various *han* and to survey Shinshu province, and so it was as a fief that it had been concerned with mathematics and surveying. Western learning developed under the daimyo Sanada Yukitsura (1791–1852) with Sakuma Shozan (1811–64) at its centre. Yukitsura was the second son of Matsudaira Sadanobu, and in his thinking, as in his administrative policies, Sadanobu was Yukitsura's ideal. Accordingly, it is not difficult to imagine that his attitude towards Western studies was not unlike that of his father. Even today many Dutch books remain in the possession of the Sanada family, and Yukitsura's collection was already famous in his own time.

At the beginning of the Tempō period, though Matsushiro was a small fief of 100,000 *koku*, 42 cannon had already been cast, thanks to Yukitsura's interest in coastal defence. In 1842, he sent ten men, including Shozan, to study with Egawa Tarozaemon (Hidetatsu) (1801–55). Tarozaemon was the *daikan*¹ (chief magistrate) of the Seven Islands of Izu (Izu Shichito) and was in charge of the coastal defences at Shimoda and Uruga. He had opened a school for European-style military science in 1842 and later forged guns for the Bakufu and several daimyo. Tarozaemon also constructed reverberatory furnaces at Saga, Kagoshima and Hagi. His longing for increased attention to Western learning is perhaps best epitomized in his remark, 'My village is still shrouded in darkness while Fuji greets the daybreak,'² a simile which likened his native place to Japan, and Fuji to the outside world.

In 1841, Yukitsura became a *roju* and the following year was entrusted with coastal defence. Prior to this, on 4 April 1825, the Bakufu had in line with its traditional isolation policy issued the so-called *Uchiharairei* (Order to Drive Away). This 'Expulsion Decree' had been pronounced as a result of the increasing appearances of foreign ships in the vicinity of Japan and said in essence:

Therefore, if in future foreign vessels should come near any port whatsoever, the local inhabitants shall conjointly drive them away, but should they go away [peaceably] it is not necessary to pursue them. Should any foreigners land anywhere, they must be arrested or killed, and, if a [foreign] ship approaches the shore, it must be destroyed.³

In 1842, Yukitsura modified the *Uchiharairei* by ordering local officials that foreign ships in need be given food, water and fuel before being 'advised' to leave. At the same time, he had guns cast to bolster coastal defence. He increased the one *bugyo* for Shimoda and Uruga to two men and planned the construction of additional batteries at those two points.

The extent of the influence of Sakuma Shozan on his daimyo is difficult to estimate. However, Shozan's study of the problems of national security coincided with the steps taken by Yukitsura. The latter was much impressed by the opinion of Shozan as outlined in a memorial entitled *Kaibo hassaku* (Eight policies for maritime defence). These eight were:

1 Fortifications must be erected at all strategic points on the coast and equipped with adequate artillery.

- 2 The export of copper through the Dutch must be suspended and the metal used for casting thousands of guns for distribution to all points.
- 3 Large merchant ships must be built. . . .
- 4 Maritime trade must be supervised by capable officials.
- 5 Warships of foreign style must be constructed and a force of trained naval officers built up.
- 6 Schools must be established throughout the country and a modern education provided so that 'even the most stupid men and women may understand loyalty, piety, and chastity.'
- 7 Rewards and punishment must be made clear, and government must be conducted benevolently but firmly; so as to strengthen the popular mind.
- 8 There must be established a system of selecting and employing men of ability in official posts.⁴

These points, while continuing to stress Confucian principles, demonstrated that Shozan recognized not only the economic and military weaknesses of the Bakufu but its sagging social structure as well. In his last two proposals he expressed the typical critical attitude of the samurai of the medium-sized and small fiefs who turned to intellectual activity such as Western learning as outlets for their thwarted ambitions. According to Sansom:

There can be no doubt that among all the causes of the anti-Tokugawa, loyalist movement which ended in the fall of the Bakufu, the ambition of young samurai was the most powerful. Agrarian discontent, economic distress, financial blunders – all these would not have suffered to bring about change without the fructifying zeal of a small number of vigorous persons anxious to exercise their talents and to rise in the world.⁵

In accordance with the proposals of Shozan, Yukitsura even made plans to construct a navy by summoning from Holland military strategists, gunners and shipwrights.

Meanwhile, in his capacity as daimyo of Matsushiro, Yukitsura promoted the solvency of the government of his own domain through improved agricultural methods. He gave alms by opening a communal warehouse; he opened new areas to cultivation by means of irrigation; he encouraged silk raising and fisheries; he planned to reorganize local finances. He followed the policies of a model Confucian statesman to such an extent that he was termed an enlightened ruler. When Yukitsura resigned as *roju* in 1846, he took Shozan with him back to Matsushiro where the daimyo had his attendant scholar apply his knowledge of the West to developing new industries for the fief. For example, Shozan tried to make glass according to Chomel's encyclopedia, and he planned to open an iron mine, make clear alum,

raise potatoes, raise pigs, and manufacture petroleum and graphite.

Yukitsura's attitude towards Western learning is clear. It was the basis for improving the financial position of the fief by expanding agricultural production, and it was the basis for new-style military preparations designed to strengthen defences. This was completely in line with official Bakufu policy and certainly coincided with the views of Shozan.

Fukui

Western learning in Fukui stemmed from the activities of the daimyo Matsudaira Yoshinaga (1828–90), who sought to use knowledge from the West both to build up coastal defences and to improve local health conditions. In 1844, he initiated close-order drill, and in 1848, he began the manufacture of Western-style artillery. He sent some of the fief samurai to study under a leading proponent of Western-style military science, Shimosone Kinzaburo. In 1849, Yoshinaga employed Ichikawa Narimiya (1818–96) from Hiroshima and in 1850, sent him to Fukui to instruct the fief samurai in Western artillery techniques. Under Yoshinaga's aegis the *han* also eventually engaged in the manufacture of ships, weapons and gunpowder.

Through the Dutch-style physician Hino Teisai (1797–1850) who had been a student of von Siebold, Yoshinaga introduced smallpox vaccine, opened a vaccination station at Fukui city and spread the gospel of vaccination throughout the fief.

Fukui *han* also strived for large-scale agricultural production, and Yoshinaga was favourably disposed to both foreign and domestic trade with warehouses at Nagasaki and with a thriving commerce all over Japan in paper, silk, tea, thread and hemp.

Mito

From a political and ideological standpoint one might imagine that the Mito fief, which was a centre of *kokugaku*-influenced, emperor-centred proto-nationalism, would have had no contact with Western learning, but indeed the daimyo Tokugawa Nariaki (1800–60) who is perhaps best known for his slogan 'expel the barbarians' (*joi*) was not only an energetic supporter of improving coastal defence but was comparatively well versed in European scholarship.

Mito's research in Dutch studies dates from 1798, when the

hereditary Nagasaki interpreter Narabayashi Jubei, who later became one of the first Japanese to study English, was summoned to Mito where the Confucian scholar Tachihara Suiken took down Jubei's report on foreign countries as *Narabayashi zatsuwa* (Miscellaneous chats with Narabayashi). In 1799 and 1800, the Dutch-style Mito physician Matsunobe Genshi, a student of Otsuki Gentaku, transcribed *Doitsugo heisho* (German language book on military [strategy]).

In 1829, after Nariaki assumed political control of Mito, his main objective was to work for better maritime defences under the two banners of the anti-Bakufu 'revere the emperor' (*sonno*) and the anti-foreign 'expel the barbarian'. He and his coterie of Mito scholars bitterly attacked Western learning and its concomitant Christianity as poisonous, amoral and evil. Nevertheless, Nariaki respected the practical values he recognized in the science of the Occident. He mutually exchanged, loaned and copied Dutch books with the daimyo of Satsuma. Then in 1832 Aochi Rinso (1775–1833) was called to Mito as a lecturer in Dutch studies.

When Matsudaira Sadakuni, daimyo of Oki, had gone to Nagasaki, he realized the importance of Dutch learning and had selected his fief physician, Aochi Rinso, to acquire it. That his choice proved an excellent one can be seen from the extensive writings of Rinso. His remarkable translation efforts included pioneering works in the fields of medicine, physics and geography. In medicine his contributions include *Ypey yakuseiron* (1823), a translation of *Handboek der materies medica*⁶ by Adolph Ypey (1749–1820); *Konsubryukku* (1824), a translation of *Geneeskundig handboek*⁷ by Georg Wilhelm Christoph Consbruch (1764–1837), physician to the king of Prussia; *Kyoka biyo*, a translation of *De geneeskundige leidsman*⁸ by the English physician Richard Reese (1775–1831); *Chiei shimpo*, a translation of *De horenvliesteek*⁹ by the German ophthalmologist Wilh. Hein. Jul. Buchhoorn; *Horon sankasho*, a translation of *Siphra en Pua*¹⁰ by Johann Philip Horn (1774–1845); and *Oranda sanko zensho*, a translation of *Schets der geheelee verloskunde*¹¹ by John Huxham (1692–1768).

The breadth of Rinso's knowledge is clearly demonstrated by these works: 1 on pharmacopoeia, 2 on internal medicine, 1 on eye surgery and 2 on obstetrics. Moreover, the problem which the Dutch-style physicians in Japan faced in acquiring Western medical techniques through the Dutch language is well illustrated here, where only 1 of the 6 volumes listed was originally by a Dutch author whereas 3 were

by Germans and 2 were by Englishmen. Again, as has been discussed earlier, the Japanese were faced with a paucity of original works and with the onerous task of working with translations of translations.

In 1827 Rinso published what is supposed to be the first Japanese book on Western physics, *Kikai kanran* (Overall view of the atmosphere) which was derived from his own draft, *Kakubutsu sohan* (Collection of natural principles). *Kikai kanran* was based on *Natuurkundig schoolboek* (Leiden, 1800), a popular treatment of such subjects as motion, heat, sound, light, magnetism and electricity by the Dutch physicist Johannes Buys (1764–1835).

The same year, 1827, Rinso put out what was perhaps his most important work, *Yochi shiryaku* (Brief record of the world). This was a 7-volume study abridged from his earlier 64-volume manuscript of a translation of *Algemeene geographie*.¹² Rinso's version included a brief discussion of geography, a general description of Europe as a whole and specifically of Russia, Italy, England, France, Turkey, India and various islands of Asia. In the section on English political structure, Rinso used the word 'parliament', and, although he said it was an assembly with two chambers, he did not make any reference to the election of members to the House of Commons. He also said that decisions of parliament were only effective if approved by the king. Perhaps it was this very bit of writing which attracted the attention of Tokugawa Nariaki. For, despite the outward anti-foreignism of the latter, his antagonism was much more strongly focused on the Bakufu itself, and he may well have felt that this man Aochi Rinso, who had knowledge of the lands across the seas where governments were controlled by one supreme and unfettered ruler, could give new impetus to the *sonno* movement.

At any rate, Nariaki ordered such Mito scholars as Matsunobe Genshi, Yoshida Yamoto, Mori Yoken (1814–68) and Suzuki Hambei (1815–1901) to study under Rinso. In 1833, Hatazaki Kanae (1807–42), a critic of the *sakoku* policy, was called to Mito and was charged with translating works on gunnery and shipbuilding. However, soon thereafter both Rinso and Kanae died without leaving any particular heirs to their skills. Only Suzuki Hambei actually absorbed something from his studies of Dutch, and he was put to work casting cannon. Moreover, when Mito constructed a reverberatory furnace, it was done under the direction of Oshima Takato (1826–1901) from Nambu *han*.

Nariaki also began a programme of vaccination, encouraged cattle

raising along Western lines, and developed the manufacture of glass as a *han* enterprise. It is clear that he wanted to bring in Western learning for its practical value alone since he refused to allow *Rangaku* to be taught in the *han* school. However, the very introduction of European scholarship gave it a prestige in Mito which tempered Nariaki's seemingly outspoken view of the so-called 'three faces of the aggressors – Western learning, heathendom, and commerce'.¹³

Saga (Hizen)

The Saga fief near Nagasaki had long been one of the feudatories entrusted with the defence of the city. An increase in the interest of Saga in Western learning was evident after the turn of the nineteenth century. The influence of the arrival of the Russian envoy, Count Rezanov, at Nagasaki in 1804, in an attempt to negotiate a trade treaty was revealed in an essay on revising the fief school by Koga Kokudo (1777–1836) in 1806. He memorialized his views on the educational system, urged reform and recounted the need to send Saga samurai to Nagasaki to master Dutch studies. From the tutelage of Shimamoto Ryusho (Ryojun), a Saga physician who had studied at Nagasaki,¹⁴ came the great Ito Gemboku (1800–71),¹⁵ Kanetake Ryotetsu (1811–84), one of the participants in the Halma translation, and Oba Sessai who had studied under Naka Tenyu and who wrote *Yaku Oranda bunten* (Translation of a Dutch grammar) based on a grammar published in Amsterdam in 1822 by Hendrik Ravekes (d. 1841), member of the secretariat of Maatschappij van het Nut van 't Algemeen, a society for the advancement of popular education and patriotism founded in 1784.

The great spurt in Western learning was due to the enlightened daimyo of Saga, Nabeshima Naomasa (Kanso) (1814–71), who maintained close contacts with Nagasaki and with the Dutch. Naomasa in 1834 set up a medical school to teach Dutch-style medicine and a so-called House of Dutch Learning (*Rangakuryo*) in 1851. Since he was in charge of the defence of Nagasaki, it was more than natural that he should employ European know-how to build up his shore batteries. The Saga samurai Sugitani Yosuke (1820–66), while at Edo to pursue the study of Dutch, spent two years working on the translation of *Het gietwezen in 's rijks ijzer-gesch gieterij te Luik* (1834) by Ulrich Huguenin (1755–1833). On his return to Saga, Sugitani presented his translation to the daimyo who immediately established an iron-casting

section under his aegis and appointed Sugitani the director. In 1850, the first successful reverberatory furnace in Saga for the casting of cannon was constructed, and by 1853 a 36-pound gun had been produced.

Much of the increase in military preparedness at Saga was due to the efforts of Takashima Shuhan (1798–1866), a Nagasaki *machidoshiyori* who inherited his official position and his basic knowledge of gunnery from his father, Shirobei. Shuhan devoted his energies and income to a detailed study of European military science with the purpose in mind of modernizing the defences of Nagasaki. At his own expense Shuhan imported from Holland small arms, field guns and mortars, and with the assistance of the Dutchmen at Deshima he became highly proficient in the handling of these weapons. He studied intensively with Reserve Colonel Jan Willem de Sturler, *opperhoofd* at Deshima (1823–7), who taught Takashima the techniques and weaponry used in the Napoleonic Wars. Shuhan also perfected the first Western-style infantry drill and precision gunnery exercises which he demonstrated for the Bakufu at the Tokumarugahara parade ground in Edo in the summer of 1841.

Since this was the era of the Anglo-Chinese Opium War and of growing Japanese fear of Russia, Shuhan's work took on added significance. The Bakufu not only rewarded and encouraged him, but ordered him to instruct responsible officials in these new techniques. Takashima Shuhan actually imparted his teachings to 280 daimyo and samurai,¹⁶ but a jealous member of the anti-Western group made an accusation against Shuhan, and in 1842, he was sent to Edo from his native Nagasaki and imprisoned until his pardon and release in 1853. Opposition to Shuhan was led by the traditional Confucian group within the government, e.g. Hayashi Jussai (1768–1841) and his son, who saw Shuhan's ascendancy as a threat to their entrenched position. Since Shuhan was also an advocate of opening the country to foreign trade, the anti-progressive element had further cause to oppose him. Nevertheless, his influence on behalf of the new military science spread throughout Japan as in the Saga fief.

As a result of Nabeshima Naomasa's constructive attitude towards Western learning, in addition to the development of Saga's armaments, local natural resources were exploited, new industries were created and foreign trade was encouraged. The true extent of Nabeshima's encouragement of Dutch studies can be seen in the numbers and subject matter of Dutch books collected in the family's store-

house: 155 on gunnery; 35 on navigation; 101 on composition and grammar; 26 on astronomy and geography; 48 on chemistry; 72 on medicine; 88 on measurement and mathematics; 32 on physics.¹⁷

Hagi (Choshu)

Dutch learning in Hagi developed in the reform of fief government of Murata Seifu (1783–1855) at the beginning of the administration of the daimyo Mori Takachika (1819–73). Seifu, in order to remedy the chronic financial difficulties of the *han*, together with strict frugality policies, carried out a programme of building up the military potential and of expanding production. He summoned Saito Hosaku (1771–1849), a Dutch-style practitioner, to be attendant physician to the daimyo. Hosaku was born in Hagi *han*, went to Osaka at the age of 19 and took up Dutch-style medicine there with Koishi Genshun who moved to Osaka from Kyoto around 1800. With Genshun's encouragement Hosaku entered Otsuki Gentaku's Shirando to continue his medical studies. In 1822 Hosaku returned to Osaka to practise medicine and the same year together with Naka Tenyu published the previously described translation of the anatomy of Jan Palfijn.

Tsuboi Shindo¹⁸ (1795–1848), a pupil of Udagawa Genshin and a leading medical doctor, entered the service of Hagi as a commissioner (*goyogakari*), and in 1839, Aoki Shusuke (1803–63), a pupil of Shindo, was made fief physician. The following year, 1840, a local medical school, Nan'en Igakkan, was established with Dutch-style medicine as one of the courses, and here once a month there was a gathering for the joint reading of Dutch books. In 1849, vaccination was introduced into the domain, and the next year a new medical school, Koseikan, was built in which Chinese and Western medical methods were combined. From the military standpoint, Aoki Shusuke translated sections of Chomel that were thought applicable, and other Dutch scholars studied saltpetre and copper.

Perhaps the most interesting example of Western influence in late Tokugawa Choshu may be seen in the career of Yoshida Shoin (1830–59). His life was typical of the young samurai involved in the anti-Bakufu movement at the end of the shogunate. As a boy he was adopted into the Yoshida family who were the professional teachers in Hagi of the anti-Chu Hsi Confucianism and military science of Yamaga Soko (1622–85), who is considered the father of Bushido. When his adopted father died, Shoin inherited his post and by the age

of 11 was giving lectures on his specialty before the daimyo. During his formative years Shoin heard tales of the advance of the Western powers into the Orient, and these reports led to his interest in coastal defence. He travelled widely and visited Nagasaki, where he studied Dutch and Chinese. Then on a journey to Kumamoto he became converted to the doctrine of restoring the emperor. But he realized that a strong Japan could only be achieved by bolstering a change in government with the science of the West. In 1851, Shoin accompanied his daimyo to Edo where he worked under Sakuma Shozan. Later that year he left the service of his lord and travelled to the north, stopping at Mito where he learned of the formalized *kokugaku* movement.

The story of his attempt to smuggle himself aboard Perry's ship to go abroad, and his subsequent imprisonment by the Bakufu for this 'treasonous' act is well known. After a few months in jail, Shoin was ordered back to Choshu where, after one more year under house arrest, he opened a small school where many of the leaders of the Imperial Restoration studied. That he was beheaded in 1859, for plotting against the Bakufu, is beyond the scope of this volume. However, the development of the thinking of such a man under the impact of the new ideas from the West, and his transmission of his ideas to the future leaders of the new Japan must be noted.

Kagoshima (Satsuma)

Shimazu Shigehide (1745–1833), daimyo of Satsuma and father-in-law of Shogun Ienari, was interested in the whole field of natural science, particularly in the light of his desire to increase agricultural productivity. In 1771, he secured permission of the Bakufu to go to Nagasaki where he personally inspected a Dutch ship and was stunned at the excellence and skill of its construction. While at Nagasaki, Shigehide stayed at the home of the interpreter Imamura Gen'uemon (Akinari) (d. 1773) from whom he learnt a great deal about Western culture. In 1779, Shigehide ordered an observatory built at the astronomical school, Meijikan, where, as noted in chapter X, he had a study made of astronomy and of the calendar under the interpreter Matsumura Genko. He summoned to his house at Edo So Senshun (b. 1758), a botanist and a descendant of a Ming refugee, and Shirao Kokkei (1762–1821), and had them compile *Seikei zusetsu* (Illustrated explanation of useful agricultural plants) (1804) in which

the Dutch name for each cereal and vegetable appears. In 1802, Shigehide sponsored Isonaga Sukei in revising the *Temmonzu ryakusetsu* (Brief explanation of an astronomical chart) and Ishizuka Saiko (Kakusai) (1766–1817) in putting out *Bankoku chikai zenzu* (Complete map of the lands and seas of the world).

Shigehide established medicinal gardens and himself wrote a handbook of bird names, *Chomei binran*, with the Latin name for each species appended. He also wrote such books as *Shitsumon honzo* (Inquiry on botany) and *Nanzan zokugoko* (Treatise on colloquialisms at Nanzan¹⁹). Shigehide was also on intimate terms with the Dutch factors, Titsingh, Doeff and Jan Cock Blomhoff (at Deshima from 6 December 1817 to 20 November 1823) and with the physician von Siebold. Not only did Shigehide correspond with these men, but he even used Romaji (the transliteration of Japanese in the Latin alphabet) in his communications. That he had high regard for Westerners may be seen from an account of gifts presented by one of his attendants to the Dutch on their way to Edo in 1822. These included gorgeous birds, rare plants, a midget fowl, a white rabbit, a mandarin duck and innumerable bolts of cloth.²⁰

With the accession to power of Shimazu Nariakira (1809–58) military preparedness became the keynote of Western learning in Satsuma. This began with the adoption of Takashima-style military reforms in 1841. Then in 1846 and 1847, Dutch-style military science was adopted, the manufacture of cannon and powder was begun and Western-style artillery batteries were placed on the sea coast. Nariakira was, of course, the driving force behind these activities. At Kagoshima he established the Rangaku Koshujo (Training School for Dutch Learning), the Gaikokujin Settaisho (Place for Receiving Foreigners), the Hari Seizosho (Place for Making Glass), and the Seimikan (Chemistry House); he built a smelting works, a reverberatory furnace and fortifications; he tested a telegraph, a camera, a gas lamp, land mines and sea mines; he started a navy of sorts. Almost all of the leading Dutch scholars of the period were called into the service of Nariakira at one time or another, e.g. Totsuka Seikai, Ito Gemboku and Tsuboi Shindo.

One of those so engaged was Mitsukuri Gempo (1799–1863), a pupil of Udagawa Genshin. Gempo made his mark in numerous fields of scholarly endeavour. In the field of medicine Gempo produced unpublished translations of Dutch works, or Dutch translations of books on anatomy, physiology, pharmacology, internal medicine,

surgery, midwifery, obstetrics and beriberi. Between 1836 and 1842 he published *Taisei meii iko*, a compilation of 16 articles from volumes X (1831) to XVI (1837) of the Dutch medical periodical *Practisch tijdschrift voor de geneeskunde in al haren ovang. verzam. door A. Moll en C. van Eldik*. He wrote geographical works on Australia, London and the Bonins; he translated Dutch books on law and government, and in a work entitled *Hakko tsushi* (Report on the world) (1851–6), he said that parliament had the power to make laws and referred to the concept of the king-in-parliament; he took a great interest in Western history and in 1850 organized a European History Society. In 1842, he translated a Dutch grammar, *Grammatica of Nederduitsche spraak-kunst uitgegeven door de Maatschappij tot Nut van 't Algemeen* (2nd printing, 1842), as *Oranda buntzen zempen* (Dutch grammar, part 1), and in 1848, he published part 2 of this work based on *Syntaxis, of woordgeving ter Nederduitsche taal uitgegeven door de Maatschappij tot Nut van 't Algemeen* (1810). (These two books were used throughout Japan as textbooks for the study of the Dutch language.) For Shimazu Nariakira, Gempo turned his talents to the problems of shipbuilding and produced *Suijosensetsu ryaku* (Brief explanation of steamships) (1848–9), based on *Volledige verhandeling over de stoomwerktuigen* (Groningen, 1837), by the remarkable Dutch mathematician and engineer G. J. Verdam (1802–66). Gempo was also a pioneer in introducing Western military tactics into Japan, and in 1848 he produced *Sanpei takuchiiki yakuhon* (Translated book on the tactics of the three branches of the army [artillery, cavalry, infantry]).

However, the Dutch learning of Satsuma was not limited to inviting scholars from outside Satsuma and to the application of their knowledge. Nariakira selected several local younger samurai and had them study Western learning and spread it within the fief. Accordingly, a number of 'samurai-scientists' appeared, e.g. Ichiki Hirotsura (1828–1903), and on the basis of their activities Western modern productive techniques were extended throughout Satsuma. Thus Nariakira's purpose not only was to expand the armed might and agricultural production of the *han* but to create new enterprises by investigating the manufacturing methods of various items which could be produced in Japan.

Nakatsu

The Okudaira family which ruled the Nakatsu domain had a long

history of association with Dutch studies. That Maeno Ryotaku was sponsored by Okudaira Masaatsu has already been stated. In 1790, Masaatsu's descendant, Okudaira Masataka (1781–1855) established a school, Shinshukan, where he encouraged literary and military studies. In his house he had a 'Dutch room' with glass sliding doors, and he even was given the Dutch name 'Frederik Hendrik'²¹ by Hendrik Doeff. Masataka was the second son of Shimazu Shigehide and seemed to share his father's enthusiasm for Western learning.

Supervising the Nakatsu samurai Kamiya Gennai (Hiroyoshi) (named 'Pieter van der Stolp' by Doeff), Masataka compiled in 1810 *Oranda jisho* (Dutch dictionary) or *Ranwajii* with the Dutch title *Nieuw verzameld Japans en Hollandsch woordenboek door den vorst van het Landschap Nakats, Minamoto Masataka. Gedrukt bij zijn dienaar Kamiya Filojosi*. In this work the Japanese words are arranged in *i-ro-ha* order and subdivided in homologous groups with the Dutch words in Roman letters.²² Masataka also had Baba Sajuro write *Rango yakusen* (Selected translations from Dutch) (1810), a handbook of nineteen assorted topics with the Dutch in *i-ro-ha* order followed by the Japanese translations. Masataka's heir Masanobu (b. 1804) ('Maurits') and his brother Masamichi (1814–42) also maintained close relations with the Dutch and encouraged further investigation of the West in Nakatsu.

Sendai

The activities of Ichinoseki, a branch of the Sendai *han*, have already been mentioned in connection with the Tatebe family of physicians and Otsuki Gentaku. In 1821, at the Sendai fief school, Yokendo, a course in Dutch learning was established. The next year, 1822, Sendai became the first domain in Japan to set up a separate medical school for Dutch-style medicine, the Igakkan. Among the *Rangakusha* in the service of Sendai were Sasaki Chutaku (1790–1846) and Ozeki San'ei (1787–1839).

Sasaki Chutaku, on the basis of what he learned from studying Chomel, in 1825 published an enlarged edition of Otsuki Gentaku's translation of Heister, *Yoi shinsho shirakuhen* (New book on surgery incorporating bloodletting). Chutaku also translated part of Johannes de Gorter's *Nieuwe gezuiverde heelkonst* which was translated from Latin into Dutch by the Amsterdam physician and surgeon Hendrik Korp.

San'ei was born in Uzen; in 1804 he went to Edo where he studied both Confucianism and Dutch-style medicine; in 1818 he returned to his native Tsuruoka and opened a medical practice; in 1823 he was invited to Sendai domain's new Dutch-style medical school as a professor. San'ei left Sendai in 1825 and for the next two years he travelled and studied in Kyoto, Osaka and Nagasaki, working under Koishi Genshun, Saito Hosaku and von Siebold. Returning to Edo, San'ei went to live with Katsuragawa Hoken in 1828. Four years later San'ei became Kishiwada fief physician at Edo and in 1835 was appointed by the Bakufu to work on Chomel and other translations in the Banshowagegoyo. On 17 May 1839 San'ei committed suicide on hearing of the arrest of Watanabe Kazan by the Bakufu authorities in the crackdown on scholars of Western learning known historically as the *Bansha no goku* (Imprisonment of the *Bansha* (scholars concerned with the 'barbarians')) (see chapter XIV below).

Ozeki produced three published translations, each in a very different field. His *Taisei naika shusei* (Compilation on Western internal medicine) (1832) based on the Dutch translation of G. C. Consbruch (*Geneeskundig handboek voor practiserende artsen*, Amsterdam, 1824–27 and 1827–33) was a major contribution to medical study. *Shinsen chishi* (Newly compiled topography) (1836) was based on P. J. Prinsen, *Geographische oefeningen of leerboek der aardrijkskunde met XXIV genommerde kaarten, naar de nieuwste ontdekkingen en volgens de tegenwoordige verdeeling der landen, opgemerkt uit de beste schriften en nieuwste landkaarten* (Amsterdam, 1817). Ozeki San'ei's last major work was the translation of a biography of Napoleon, *Napoleon* (1837) from T. van der Linden, *Het leven van Bonaparte: naar het Fransch* (Amsterdam, 1803).

Nagoya (Owari)

Rangaku in Nagoya *han* seems to have begun with Nomura Ritsuei, who had studied Dutch-style medicine in Nagasaki under the interpreter-physician Yoshio Kosaku. In 1783 Ritsuei opened a practice in Nagoya and was appointed one of the physicians to the daimyo. Of pivotal importance, however, to the spread of Western learning in the Nagoya area was Yoshio Nanko (1787–1843), grandson of Yoshio Kosaku, who was employed by the Nagoya domain in 1828 as a translator, as fief physician and as a teacher of science. Nanko had been a student of his uncle, Yoshio Joen (1785–1831), who had been a

disciple of Shizuki Tadao. In fact, two of Nanko's works probably reflect the influence of Tadao on his scholarship.

In 1814 Nanko wrote *Rokkaku zenpen* (Introduction to the six cases) which was based on Tadao's grammatical concepts of the Dutch language. Probably Nanko's most influential publication was *Rigaku nyushiki ensei kansho zusetsu* (Illustrated explanation of scientific deductions from Western meteorological observations) which went through three editions (1823, 1826, 1828). Derived from lectures Nanko gave to his students, the book drew heavily on two Dutch sources but most heavily on the writings of Tadao. The Dutch sources were the same Dutch translation of Benjamin Martin's *The Philosophical Grammar* which Motoki Ryoei had used and *Katechismus der natuur* (Amsterdam, 1777-9) by the Leiden graduate in philosophy and science, the minister Johannes Florentius Martinet (1729-92). The latter book was primarily written 'for Dutch youth in order to introduce them to divine providence through the study of natural providence',²³ and again one is confronted with the dilemma of the haphazard nature of the Dutch books available in Japan. Nevertheless, Nanko apparently was able to overlook the essentially religious nature of Martinet's work and to utilize solely those sections which explained heliocentricity.

Rigaku nyushiki ensei kansho zusetsu consisted of three parts and an appendix. Part 1 gives diagrams illustrating the astronomical system of Ptolemy, Tycho Brahe (1546-1601), the Danish astronomer, and Copernicus; part 2 deals with the sun, the planets, the earth, the solar year, the moon, eclipses, etc.; part 3 discusses each of the planets, the fixed stars, the constellations, the comets, etc.; the appendix entitled *Chido wakumon* (Certain questions on the motion of the earth) dealt with Tadao's ideas from *Rekisho shinsho*, especially Tadao's attempt to interrelate his Newtonian discoveries with traditional Chinese concepts. Nanko, working of course at a much later date than Tadao, and having much more information available to him, was far less apologetic for his positive attitude towards heliocentricity and the scientific advances in the West generally.

In medicine Nanko's major published translation was of a book by the Dutch physician Jan Kouwenburg, official surgeon of Middelburg in the seventeenth century. Although the volume by Kouwenburg was written as a manual for physicians on sailing ships, it bore the Japanese title *Shinyaku Oranda naigai yoho* (New translation of the essential methods of Dutch internal medicine and surgery) (1820).²⁴

For the Nagoya *han* Nanko's principal duties were teaching whatever he knew about learning from the West and working with detonators and explosives, apparently for their potential military value. Nanko's research was reported in *Fumpoko* (Consideration of explosives) written in 1843, the same year in which, while making mercury fulminate, he was gravely wounded in an explosion and died from loss of blood.

Nanko's disciple Ueda Nakatoshi (1809–53) was a leader in the study of European military science, and the Owari Yogakusho (Owari School of Western Learning) seems to have been maintained in Nakatoshi's home as a half-public, half-private institution. After Nakatoshi's death, the school was moved to the home of Ito Keisuke (1803–1901), a native of Nagoya, a pupil of Nanko and a disciple of Fujibayashi Taisuke and von Siebold. Ito's significant contributions were in the fields of botany and medicine. He is best known for his *Taisei honzomeiso* (Western botanical nomenclature) (1829) which was derived from Thunberg's monumental *Flora iaponica* published in Latin in Sweden in 1784. Ito's version, which bore the Dutch title '*Naamlijst van gewassen door den beroemden natuuronderzoeker C.P. Thunberg M.D. op Japan gevonden. Herzien en met Japansche en Chineesche namen verrijkt door Ito Keisuke te Nagoya,*' represented his desire to acquaint his fellow Japanese scientists with the Western nomenclature for Japanese plants. In medicine Keisuke investigated and reported on such varied areas as Western surgery, the treatment of burns, cholera and the scabies mite as described in Dutch medical texts. Clearly the scholarship of Yoshio Nanko, Ueda Nakatoshi and Ito Keisuke made Nagoya the centre for the diffusion of Dutch knowledge in central Honshu.

*Fukuoka (Chikuzen)*²⁵

In Fukuoka *han* one can trace rather clearly the rise of Western learning after the time of Yoshimune. Since Yoshimune had set the example of encouraging the practical aspects of *Rangaku* in order to strengthen the feudal system, the scholars of the Occident in Fukuoka in general devoted themselves to the policies of increasing agricultural production and of building up military defences.

Fukuoka had been for centuries the base for the transmission of continental culture, and in medieval times it grew rich as a port of call on the trade routes to the southern seas. It was also the great focal

point of Christian missionary activity. After the *sakoku* edict the same domain had the official duty of receiving Korean envoys and in alternation with the Saga fief took charge of the garrisoning of Nagasaki. In this environment the currents of Western learning had easy entrée, but the data on early developments are meagre. Hara Sanshin was a fief physician who in 1686 received a diploma in Dutch surgical treatment from a Dutch doctor. About the same time Kaibara Ekiken (1630–1714), the famed Fukuoka Confucianist and scientist, visited Nagasaki several times and, though he had opportunities to have contact with Western studies, his sole contribution in this line was a preface to the *Komo geka soden* of his friend Mukai Gensho.

Some fifty years after Ekiken's death Uchino Genka (1744–1803) can perhaps be called a Dutch scholar. His Western learning was related to his attempts to increase agricultural production within the fief. He first devised a plan for revolutionizing agricultural policy, and he introduced agricultural implements of a Western scientific practicality although the actual effect of his efforts is not known. In a collection of his writings published in 1772, in a section called *Kiki zusetsu* (Illustrated explanation of strange implements) Genka described a '*hahiarankiriya*', a device which supposedly removed stone and earth from canals and rivers and put them in the sea; in the same work he recounted the methods of the manufacture of money and of gunpowder in Holland, but by writing such things as, for example, that the Dutch burnt human bodies to make gunpowder he evidenced the naiveté of his knowledge of the West. In *Saimin sosho* (Notes on saving the people) of 1795, Genka suggested the possible utility of Western learning in agricultural techniques, water and land usage, reclamation, and the like. He also dealt with the manufacture in the West of such natural products as salt and sugar and with mining techniques. He specifically referred to coal mining in Europe and discussed the use of a siphon to get the water out of coal mines but admitted that he did not know whether or not it was practical.

Since the major Western scholars of Fukuoka emerged after the Kansei (1789–1800) era when *Rangaku* achieved prominence throughout Japan, it may be informative to examine the relationship of the social situation and ideology of the so-called Kamei school to Western learning. Kamei Nammei (1744–1800), a Confucian physician and follower of the *kohoka* medical system, was appointed as head of the *han* school, Seigakkan, in 1784 at the age of 41. At that time, in accordance with the purpose of strengthening administration in

various domains, many of the daimyo set up local schools. In Fukuoka two distinct schools were established, one, the Togakkan, under Takeda Sadayoshi, a disciple of the school of Chu Hsi, which drew on the Confucianism of Kaibara Ekiken, and the other under Nammei.

The appointment of Nammei to head a separate institution was in the nature of a reward to him for his several contributions to reviving the finances of the fief by promoting loans, printing paper money and organizing *han* monopolies. Nammei professed the teachings of the *kogaku* philosophers, but his viewpoint was said to be eclectic enough to embrace facets of Chu Hsi and also of Buddhism. Accordingly, his policy towards his pupils was one of relative non-interference with the objective of permitting their intellects to have full scope. This attitude was conspicuous when compared with the strictures of the orthodoxy of the group under Sadayoshi.

The conflict between the two schools is again indicative of the general intellectual ferment of this era. The Chu Hsiism of the Tokugawa Period, as has been discussed, was encouraged as an official study and was the standard of individual morality. But later it came to be regarded by some as an abstract philosophy incapable of meeting the developments of the times, and the seeming stagnation of Takeda Sadayoshi's Togakkan was one example of this. The differences between the two schools continued, but eight years after its founding the Seigakkan was destroyed by the dismissal of Nammei.

What actually happened to Nammei is not entirely clear. Attributing his downfall to too much dissipation in sensual pleasures would be merely a surface interpretation. The problem lies in his writings: *Okanoagatashirojima ki* (Record of Okanoagatashirojima) and *Dazaifu kyushi hibun* (Inscriptions on old monuments and relics at Dazaifu). Supposedly relying on ancient records, in the former he wrote of the ancient inhabitants of Choshu who wiped out Chinese ships with the combined power of Chikuzen and Choshu, and in the latter he expressed the ideal of reverence for the emperor. Some one hundred years earlier Kaibara Ekiken had investigated the same matters and it is said that he too tried to clarify these antiquarian remains. By reading the documents Nammei recalled the prosperity of Fukuoka in the monarchical age when foreign ships gathered there, and he perceived a reverential attitude on the part of these foreigners of old for the Japanese monarchy. In his own time, however, Nammei contended that the foreign attitude towards Japan was completely the opposite. Here one sees the nascent 'nationalism' which Nammei

evidenced as a *kogakusha* gradually increasing with the stimulus provided by the more frequent appearances of foreign vessels. Yet even in an era when Bakufu power was waning, it was still dangerous to express implicitly anti-Tokugawa and pro-emperor feelings.

Ultimately the after effect of the prohibition of unorthodox studies (*igaku no kin*) proclaimed jointly in 1790 by Matsudaira Sadanobu and Hayashi Jussai reached Fukuoka. This edict was directed primarily at the *kogakusha*, and it is not surprising that the propagation of unsanctioned views produced some victims. In these circumstances the fate of the Kamei group quickly took a turn for the worse. Nammei's son Shoyo (1773–1836) took over as head of the Seigakkan, but very quickly the prosperity of former days disappeared. In 1798, by chance or by intent, a fire broke out, and the Seigakkan burnt down. On this occasion Shoyo was dismissed as an official Confucianist. Misfortune followed misfortune. In 1800, there was a fire in Nammei's mansion at Dazaifu, and he is believed to have gone insane and died. This was understood by the orthodox Confucianists as the just punishment of heaven which had to be visited on one who ignored 'morality' and led the life of a 'libertine'.

However, Nammei's death was not the end of this affair. According to Hirose Tanso (1782–1856), from Hida in Bungo, who studied at the Seigakkan, all the pupils of that school were dismissed and consolidated with those of the approved Togakkan where even the outstanding scholars of the Seigakkan were entered as ordinary students. Moreover, the ban on unorthodox studies which had closed the Seigakkan was a definite obstacle to any progress in Dutch studies in Fukuoka. Yet from the evidence available it seems clear that there was a connection between the Kameiists and students of Dutch learning.

For example, since the natural sciences such as astronomy and medicine were the main contents of Dutch studies at that time, it is worthwhile to note Nammei's attitude towards science. Since he followed his father who was a student of the *kohoka*, the approach of his medical theory was one of the practical pursuit of knowledge. Although Nammei recognized the arguments of the *kohoka* about such things as veins, perspiration, vomiting and diarrhoea, he criticized theories not based on experiment. And he was not ignorant of Western medical studies, for it seems that during his visits to Nagasaki he learned of Dutch-style medicine from the Dutch interpreters.

Nammei's greatest tie with Western learning was probably his concern about the foreign problem. For his personal seal he used the Chinese characters *Tozainamboku* (East, West, South, North). He composed poems about his infatuations with Nagasaki. In praising Mt Fuji he added it to the Western Seven Wonders of the World and admired the 'Eight Wonders.' His view of the world was quite broad, for his time, and he saw Japan in a field of vision which encompassed the entire world. For example, Nammei was in contact with the local castaway Magoshichi, not out of idle curiosity, but in order to be better able to formulate his views on the increasingly serious foreign incursions. He considered as the embodiment of the first steps in this direction *Tomonjissaku* (Questions and answers on ten policies) (1803) by Aoki Kosho (1760–1812) and the *Kikanroku* (Record of strange sights) which was a record of the interrogation before the shogun of the castaway Kodayu and his party who had been in Russia. Nammei also wrote a poem in admiration of Western cannon which had already been placed outside the castle in the drill grounds.

According to Nammei's son Shoyo, the importance of national defence in Fukuoka was greater than in other domains, and he wrote *Bokai chogen* (Clear words on sea defence) in which he stated that the changes in and conditions of foreign countries had to be well known. Nevertheless, at a time when some of his pupils were pursuing European scholarship, he warned against the danger of falling into blind worship of the West. According to him, the adulation of the 'red-haired barbarians' by the Western scholars of Japan closely resembled the Confucianists' view of China and was a demeaning of divine Japan.

The methodology of Western science was not acceptable to Shoyo. Rather, its essential characteristic of research into the laws of nature was seen as diminishing the power of heaven and the spirit of the *kami* in the natural world. For example, Oka Kenkai (1799–1839), who gained fame as a brilliant disciple of von Siebold and who in 1832 was made physician to the Yoshikawa family at Iwakuni, was a pupil of Shoyo. After the so-called 'von Siebold affair' (see chapter XIII below) Kenkai was denounced for his excessive study and too serious nature, and he died of illness caused by persecution for his ideas – a pitiful character in the history of Western learning. During his trips to Nagasaki to study, Kenkai had pursued Chinese studies with Hirose Tanso and with Shoyo. Shoyo addressed a poem to Kenkai in which he said that in general in Japan Western scholars were like worms

inside a lion and that by too much love of knowledge they had a tendency to forget the principles of morality. It will never be known, of course, how much of Shoyo's critical attitude was a result of the fate of his father and of the spirit of his time and how much of it was sincerely meant.

However, despite the tragic fate of Nammei and the apparent ambivalence of Shoyo, their tradition seems to have given rise to a matrix of Western scholars interested in the defence and agricultural development of Fukuoka. The following are representatives: Aoki Kosho, *Tomon jissaku* (Questions and answers on ten policies) (1803); *Banjin hakujo wage* (Japanese translations of the confessions of barbarians)²⁶ (1804); and *Nankai kibun* (Chronicle of the Southern Seas); Abe Ryuhei (1784–1850), *Nikoku kaimeiroku* (Record of a treaty between two countries) (1826); *Kamon zassai* (Miscellaneous inquiries) (1828); and *Shin'u shoshiki* (Brief information on the new world) (1849); Kuroda Narikiyo (1775–1849), *Honzo keimo hoi* (Supplement to an introduction to botany) (written before 1851); Takeya Yushi (Ryotei) (1820–94) *Gyuto kokuron* (Theory of smallpox) (1849); Nagai Seigai, *Bankoku yochi zenzu* (Complete map of the world) (1846); and *Taisei sansai seimo* (Correct interpretation of heaven, earth, and man in the West) (1850).

In this list half the writings are in the fields of geography and history, which at this time were media for information on current world conditions. Kamei Shoyo, who contributed the preface to Aoki Kosho's *Nankai kibun*, wrote that Kosho inherited the desire of Nammei to know the outside world. Kosho himself also brought in the dying injunctions of Tokugawa Ieyasu and showed a proper attitude of respect for his forefathers saying, 'As Toshogu said, "In governing Japan, if there are upheavals abroad, one must be on guard"; therefore the importance of reporting the conditions of foreign countries is an eternal injunction.'²⁷ Abe Ryuhei, in the preface to his friend Nagai Seigai's *Taisei sansai seimo*, stated that Western learning had probably best investigated heaven, earth and man. This was because Occidental computations were based on travels of over 10,000 *ri* affording an excellent understanding of geography. Since Japan must be prepared for emergencies by examining foreign conditions and by assuming the responsibilities of defence, Ryuhei said that this was the significance of Nagai's work, and he stressed the need for knowledge of the outside world.

Kamon zassai recorded the questions and answers about zoology

and botany exchanged by the daimyo of Fukuoka, Kuroda Narikiyo, and von Siebold, and to this were added the views of Ryuhei himself as Narikiyo's mentor in Dutch studies. According to Ryuhei's analogy, as a superior man quotes a story without omitting any words, by employing a superior intellect based on the positivism of Western learning, one should be able to supplement the many shortcomings of Japan. He also said that basic policies of defence could be formulated by examining in Western learning not only natural science but Western society and customs as well. Ryuhei concluded by quoting Chi Hsi probably in order to maintain the proper outward balance in his thinking. Moreover both Aoki Kosho and Abe Ryuhei explained the significance of their interest in Western learning as a step in the defence of Japan against the so-called barbarians.

In 1798 Kosho went to Nagasaki as a *kaimonobugyo* (commissioner of marketing) for the *han* but died soon after of heart disease, without having completed *Nankai kibun* which was published long after his death. In this work he recorded stories which had been heard from Magoshichi, mentioned above, and from other castaways in the South Seas and South China, and by revising and supplementing these he evolved his own knowledge of the world. In *Nankai kibun* Kosho also noted the names of plants, animals, places, etc., from both Dutch and Chinese books. That he himself added detailed notes is its real significance. For the reader, by perusing the tales of Magoshichi and the notes of Aoki Kosho, was bound to have concrete knowledge of the rivalry on the southern seas among the various Western countries and of their territorial conquests. Kosho, commenting on this situation, said, 'The great folly of the southern peoples is wisdom for the peoples of the north',²⁸ as his greatest anxiety was the descent of Russian power.

Abe Ryuhei's *Nikoku kaimeiroku* reported in detail the conclusion of the Sino-Russian Treaty of Nerchinsk (1689) which was one of the first steps in the Russian movement into East Asia. The original work on this subject was by the French Jesuit Jean Gerbillon (1654–1707) who was attached as an adviser and interpreter to the Chinese treaty mission. The impetus for the translation by Ryuhei was the arrival of the Russian mission at Nagasaki in 1804. At that time Shizuki Tadao, Ryuhei's teacher of Dutch studies, was very ill, and he asked his pupil's aid in planning to try to warn the Japanese by recording Russia's southward march. *Nikoku kaimeiroku* included several pages of maps of both China and Russia in order to facilitate an

understanding of the text. Ryuhei also wrote about conditions in Mongolia, Russia and China before and after the treaty by reference to other source books. In addition, he demonstrated his desire to give a true picture of the situation by clearing up what he believed to be inaccuracies in Gerbillon's original.

First, Ryuhei recorded Shizuki Tadao's opinion as *Tadaochu* (Tadao's notes); then he added his own notations in which he meticulously marked any statements he himself did not understand. He impeached one by one those points in which the original criticized the Chinese side. For example, in regard to the 'foolish weaknesses' of the Chinese interpreters, Ryuhei said that, since the author was a Westerner, he spoke improperly of the envoys of the magnificent Ch'ing dynasty and probably favoured the Russian side. Moreover, when the Frenchman wrote that the Chinese claims were unfounded, Ryuhei said that the territory in dispute was originally Chinese and that the Russians were the aggressors. Finally, when Gerbillon criticized the anti-foreignism of the Ch'ing dynasty, Ryuhei answered by stating that it was after all Russia which was responsible for the conflict leading up to the treaty.

Ryuhei's *Shin'u shoshiki*, which recorded the history and geography of the continents of North and South America, was ordered written by the daimyo of Fukuoka, Kuroda Narihiro (1811-87) who, as the ninth son of Shimazu Shigehide, was adopted by Kuroda Narikiyo as his heir. Narihiro, as a supporter of Western learning, established a smelting works, a reverberatory furnace, a chemistry laboratory, a hospital, and in 1855 a medical school called Sangeikan. Ryuhei's emphasis in *Shin'u shoshiki* was on the oppression of the natives in the Americas by the Europeans. He also showed his erudition by referring to over twenty different categories of Western books.

Nagai Seigai did not stay in Fukuoka, but moved to Edo where he opened a school at which many of the future leaders of the Meiji Restoration studied. It is clear that Seigai read Western books on physics and chemistry since he utilized certain of their contents to try to explain the creation and development of all things in the universe. His particular theory of humanity, based on both Eastern and Western thought, which he discussed in *Taisei sansai seimo* was unusual among the many scholars of things Western in Japan.

One characteristic that was common to the writings of both Aoki Koshō and Abe Ryuhei was their nationalistic outlook. Koshō opposed foreign trade as a depletion of national wealth, and he

condemned those who 'drunk with Western learning' celebrated the Dutch New Year. Nevertheless, in *Tomon jissaku* he said about Dutch studies,

Well-versed samurai listen and profit; foolish students learn and lose. Those who gain know intimately and with understanding the customs of countries of the four corners of the earth . . . and examining these from where they sit make use of their knowledge in plans for administering Japan; [Arai] Hakuseki and Hayashi Shihei are such men. Those who lose are frightened by astronomy and surveying; they are concerned about strange theories; they are led astray by ordinary customs; they revile anew the spread of learning by using rare medicines, the origins of which are not detailed; these are the ones who indulge in bewitching tales.²⁹

Thus Kosho's apparently contradictory views of Western learning may be attributed to the confusion of the times and perhaps also to Kosho's jealousy of his position as official adviser to the fief on Dutch studies.

Although Kaempfer and von Siebold both pointed out the similarities between the Japanese and the Tatars and said that they had the same origins, Ryuhei opposed this saying, 'The fact that we Japanese are descended from *kami* cannot be known by foreign barbarians'.³⁰ However, it is interesting that Nagai Seigai who was the close friend of Ryuhei, confirmed Kaempfer's theory in direct opposition to Ryuhei asserting, 'When one judges from appearance, it is clear that there is descendance from the Mongols'.³¹ However, Seigai too, in comparing Europeans and Asians said that the latter excelled. This was a representative example of an unsophisticated comparative view of Europeans and Asians which was propounded by many of the scholars of the West in Japan, most of whom seemed to believe that Asians were superior to Europeans. But since this viewpoint was so prevalent among the *yogakusha*, it is very possible that such expressions were made in their own self-defence.

In order further to supplement this examination of Western learning in the Fukuoka *han*, writings in the field of natural science should also be noted. *Honzo keimo hoi* by the daimyo Kuroda Narikiyo was intended as an extension of Ono Ranzan's (1729–1810) *Honzo komoku keimo*. This latter book differed from most of the previous Japanese books on natural history by not relying solely on Chinese sources and by advocating research by experiment. Narikiyo's particular interest was probably due to the great detail of *Honzo komoku keimo* with regard to the plants and animals of his native place. Narikiyo's know-

ledge of plants and birds seems quite accurate, but his 'scientific' spirit did not prevent him from asking von Siebold about the ghosts of animals.

Takeya Yushi was the eldest son of Takeya Mototatsu (1785–1852), a disciple of Kamei Nainmei. Mototatsu and Hyakutake Banri (1794–1854) were pioneers of Dutch-style medicine in Fukuoka. These two, who studied Western medicine under von Siebold, with the permission of Kuroda Narikiyo carried out a dissection at Hakata Ohama in 1841, i.e. seventy years after Sugita Gempaku's famed experiment at Edo.

Yushi had studied at Osaka and after returning to Fukuoka, became attending physician to the daimyo, Kuroda Narihiro. He maintained contact with the *yogakusha* of Edo and Osaka and introduced their writings into the domain. However, the real perception of the value of Western medicine among the general public in Fukuoka can be said to have been the occasion of the introduction of smallpox vaccination. In 1845, Yushi was in Osaka and, having translated *Setto sagen* (Trivial words about smallpox), he conducted experiments and planned the vaccinating of his native area, but many rumours spread throughout Fukuoka and opposition to his intentions was strong. Thus, for the purpose of promoting his program of vaccination he wrote *Gyuto kokuron* (Essay advocating smallpox vaccine) in which Yushi attested that since the inception of Dutch–Japanese contacts 'from among the books, implements and medicines brought here, there has not been one false thing. . .'³²

As described above, scholarship concerned with information from the West had progressed significantly in Fukuoka *han* since the late eighteenth century. Despite its geographical distance from the centre of *Rangaku* in Edo, as in so many other parts of Japan, local interest had developed, especially in the field of medicine, and was nurtured by its interrelationship with the traditional scholarly base provided in Fukuoka's case by the Kamei school of thought. Moreover, with the encouragement of the two forward-looking Kuroda daimyo, *yogakusha* in Fukuoka were given the opportunity to demonstrate the practical merits of Western knowledge in supplementing the 'divine attributes' which blessed Japan.

These, of course, were only a few of the many feudal domains throughout Japan where Western learning flourished, but they were

perhaps the most important. Without exception an interested daimyo, like the Shogun Yoshimune in an earlier period, had to provide the leadership, the stimulus and, most significantly, the approval for such activity. But, as has been noted above, once such a signal was given, the potential for the growth of the study of Western applied techniques was impressive.

Factors which contributed to attracting the concern of a given daimyo to Dutch studies are not difficult to discern. They involved both the changing internal political situation, especially the weakening position of the Bakufu vis-à-vis the *han*, as well as the transformed international scene in East Asia where the European powers were evidencing much more aggressive and expansionist policies. In the light of both of these developments, local domain rulers and administrators were directing their attention to such matters as coastal defence and economic development.

It was fairly widely known in Japan in the first half of the nineteenth century that the West was overwhelmingly superior to the Asians in both weaponry and gunnery. Thus, since the Bakufu itself was pursuing an increasingly active programme of improving its coastal defences and of learning about the techniques of modern warfare, it is not surprising that many of the domains were separately embarked on a similar course. Further, as the national economy became more sophisticated and the traditional sources of feudal income diminished both in amount and to some extent in importance, the necessity of improving the financial wherewithal of the *han* was clear. Accordingly, the developments of new and diversified as well as increased agricultural production, of land reclamation, of domain-sponsored industrial enterprise and of the exploitation of natural resources within the fief boundaries were recognized in several *han* as essential aspects of economic betterment.

Like the shogunate itself, many domains were well aware of the practical necessity of the utilization of knowledge gained from the West in order to achieve even minimally viable defences or even slightly more prosperous economies. Nevertheless, almost up to the Meiji Restoration, nothing more was suggested as being obtainable from the West than the few practical techniques to be learned in such fields as medicine, astronomy, military science, zoology, botany and mineralogy. Just as in the Bakufu itself no consideration seems to have been given, in the Banshowagegoyo, or elsewhere for that matter, to raising fundamental questions about the nature of the society and the

culture of the West in which had evolved the techniques now increasingly in demand, so in the *han* too *Rangaku* was seen as little more than a possibly useful supplement to an otherwise well-ordered and harmonious system.

XIII

Western learning in private schools

As stated at the beginning of the previous chapter, two important developments in the history of *Rangaku* occurred in the first half of the nineteenth century. The first was the rise of Western learning in the various *han*, and the second was the appearance of numerous private schools where the teaching of Dutch studies was the primary *raison d'être*. Such a school as Otsuki Gentaku's Shirando was not an isolated example. However, like Shirando, these private schools, whether large or small, all had medical education as the original reason for their founding and as the principal stimulus to their continuing existence. But, given the interest aroused nationally by the importance of the foreign problem and its growing influence on the feudatories who sent their young samurai to such schools for study, the private schools which specialized in *Rangaku* experienced a growth which extended their role well beyond that of medical educators. For they became centres of the study of botany and chemistry and, more significantly in the light of events, of military science, artillery techniques, etc. Ultimately, too, many of the students were not reticent in admitting that they had no intention of becoming physicians. Moreover, these schools were by no means concentrated in Edo but appeared throughout Japan wherever there was a demand for the new learning from the West.

A private school called Juntendo was opened in Sakura *han* by Sato Taizen (1804–72). Taizen was a pupil of Adachi Choshun (Sanai) (1776–1836), a Dutch-style astronomer (appointed *tenmonkata* in 1835 at the age of 59) and obstetrician from Osaka, a disciple of Asada Goryu, and author of *Iho kenki* (Research on medical methods) (1831–3), a translation of *Onderwys in de beoefenende geneeskunde, ten dienste der legeren dorpchirurgyns* (1779), the Dutch translation by G. ten Haaff (1720–91), surgeon and lithotomist of Delft, of the German original by the Viennese pupil of van Swieten, Anton Stoerck (1731–1803). As a young man, Taizen had gone to Nagasaki to study and had returned there from 1835 to 1838 to work with Johannes Eddewin Niemann (1796–1850), physician to the Hollanders on Deshima, and

with the interpreter-physician Narabayashi Eiken (1801–75). In 1835, he began a private practice in Edo, but in 1843, he was called to Sakura by the daimyo, Hotta Masaatsu (1810–64), who was a member of the Itachi family from Sendai and had developed an appreciation for Dutch learning. Taizen seems to have been eager to accept Masaatsu's offer because of increasing Bakufu surveillance in Edo. Taizen's Juntendo acquired an excellent reputation and drew students from all parts of Japan.

In 1809 Koishi Genshun's son Koishi Genzui (1784–1849), who had studied under Otsuki Gentaku, Sugita Gempaku and Udagawa Genshin, opened a school in Kyoto called Kyurido. Among Genzui's writings were: *Kyuridohofu* (A storehouse of the methods of Kyurido); *Kyurido kogi* (Lectures of Kyurido); *Yakusei tekiyo* (A summary of the character of medicines); and *Ranyaku bunryoko* (Observations on the measurement of Dutch medicines).

Perhaps it was the rapid expansion of such private schools as Kyurido or perhaps it was the continuing pressure of shogunal suspicion of unofficial Western studies which caused Koishi Genzui to prescribe certain regulations for his students, regulations which were clearly designed to protect them during their studies:

- 1 As for Dutch books, do not read any other books than medical books.
- 2 Do not slander people without giving any clear reason.
- 3 When there is no other appropriate translation available, it will be all right to use Dutch words (such as names of drugs, medical and surgical tools, and scientific signs and measurements), but otherwise do not write Dutch words, but use Japanese words.
- 4 Do not discuss subjects other than medicine when talking about foreign countries.
- 5 Also do not express foreign opinions, or carry or possess unusual tools.¹

Junseishoin, a private school opened in 1839 at Kyoto Higashiyama Nanzenji, was the product of the genius of Shingu Ryotei (1787–1854). Ryotei from Yura on the Japan Sea in Tango studied at Nagasaki from 1813 to 1818 and during those years became very close to the Dutch physician in residence Jan Frederik Feijlke who was at Deshima from 1806 to 1817. At the age of 32 Ryotei opened a medical practice in Kyoto where he was extremely well thought of as a specialist in Western-style medical techniques. Some twenty years later when he opened Junseishoin, Ryotei had earned enough money to build a small school building with a garden for medicinal plants in the rear.

Although Dutch-style medicine was taught systematically at Junseishoin in eight courses: physiology, diagnosis, pathology, surgery, internal medicine, natural history, chemistry and pharmacology, Ryotei was careful to give proper precedence to Chinese medicine. He himself lectured on it, and regular lectures by a Confucian-trained scholar were held on Chinese history and the Confucian classics. Nevertheless, the Junseishoin became the centre of Western scholarship at Kyoto.

Ryotei's own scholarship included a number of unpublished manuscript translations of works by several distinguished European scholars and physicians. These included the Dutch translations of Benjamin Martin, Marcello Malpigni (1628–94), Hufeland, Plenck, Tissot and van Swieten as well as of the Dutch originals of Bernhard Siegfried Albinus (1697–1770), Frederik Dekkers (1648–1720), Frederik Ruysch (1638–1731) and Thomas Schwenke (1693–1767). Ryotei's published translations were: *Kaitaisoku* (Laws of anatomy) (1858) which was a complete translation of D. van Gesscher's *Schets der ontleedkunde*, an annotated translation from the Latin of J. J. Plenck (4th edition, 1804); *Jinshin bunrisoku* (Rules for dissecting the human body) (1859) based on the Dutch translation *Natur- en scheikundige verhandeling over de vochten des menslijken lichaams* (Dordrecht, 1797) by the physician–linguist H. A. Bake (1754–1805) of J. J. Plenck's Latin original; and *Kyuri gekasoku* (Rules for mastering the truths of surgery) (1816–50), a translation based on the third and fourth editions of the Dutch version by Hendrik Korp, *Nieuwe gezuiverde heelkonst* (Amsterdam, 1762 and 1790), of Johannes de Gorter's *Praxis medicae systema* (1750).

In 1833, Ito Gemboku, mentioned in the preceding chapter in connection with the Saga domain, moved to Shitaya Okachimachi Izumibashidori at Edo where he established his famed school, Shosendo. Gemboku's career is an example of the rise to great prominence of a commoner by means of Western learning. Gemboku was from a farm family in Hizen, Kanzaki-gun. As a youth he became the adopted son of an insignificant Saga samurai named Ito. After opening a practice as a Chinese-style physician at the age of 19, he went at 22 to study Dutch medicine with Shimamoto Ryojun and Dutch language with the interpreter Inomata Denjiuemon at Nagasaki. After almost four years of additional study under von Siebold, in 1828 Gemboku opened a practice at Edo as a Dutch-style physician and married Inomata's daughter. In 1831, he was made a samurai for

life by Nabeshima Naomasa, daimyo of Saga, and was allotted rations for seven men.

Among Gemboku's writings were the published *Iryo seishi* (Rudiments of medical treatment) (1835–58) translated from *Grondbeginselen der praktische geneeskunde, door ziektegeschiedenissen opgehelderd* (Nijmegen, 1826–28), which was itself a translation from the original German of the Prague physician, I. R. Bischoff, and such unpublished works as *Gyutoshuhohen* (Documents on the method of vaccination), and *Hodaichikuzo ryakusetsu* (Brief explanation of the construction of gun batteries). Two Dutch books, translations from German and English respectively, on which Gemboku relied heavily, especially in his teaching, were *Grondbeginselen der natuurkunde van den mensch* by J. F. Blumenbach (1752–1840), professor of medicine at Gottingen, and *Nieuwe huisselijke geneeskunde* (A practical dictionary of domestic medicine) by the English physician Richard Reece (1775–1831).

The tremendous increase in interest in Western learning among the *bushi* can be attested to by the fact that 179 of Gemboku's 416 pupils at Shosendo were from the military class: 2 Bakufu officials, 138 samurai from 60 different *han*, 12 junior samurai and 27 others who implied that they were of the military caste.² Among the leading Western scholars who studied at Shosendo were Aoki Kenzo (1813–68) and Tahara Genshu (1815–69) from Hagi, Shibata Shuzo (1820–59) from Sado, Takabatake Goro (1813–59) from Tokushima, Takeda Isaburo (1827–1900) from Osu, Tsuda Shin'ichiro (1829–1903) from Tsuyama, Matsuki Koan (1833–93) from Kagoshima and Oshima Takato from Nambu.

In 1829, at Edo Fukagawa, Tsuboi Shindo opened his own school, the Nisshudo, where he taught several hundred pupils. Shindo, who was mentioned in chapter XII as a commissioner in the Hagi domain where he was appointed an official physician, was a native of present-day Gifu Prefecture where he was discovered employing his talents as a masseur by his mentor Udagawa Genshin who gave him his start in Dutch-style medicine. It was also Genshin who introduced Shindo to the works of Boerhaave and encouraged Shindo's interest in Boerhaave's ideas about medicine.

Shindo's major written contribution to medicine in Japan was his manuscript translation entitled *Boerhaave manbyo chijun* (Boerhaave's standard treatments for all sorts of illnesses) (1824–6) based on the Dutch translation, *G. L. B. van Swieten: Verklaring der korte*

stellingen van H. Boerhaave over de kennis en genezing der ziekten (Leiden, 1760–63, 2 vols.), of the Latin original, *G. L. B. van Swieten. Commentaria in Boerhaave aphorismos de cognoscendis et curandis morbis* (Leiden, 1741–72, 5 vols). As in so many previous instances in the history of *Rangaku*, this was again not the original work of Boerhaave. In fact, the original *Aphorismi* of Boerhaave, on which his pupil van Swieten's extensive commentaries are based, has never been translated into Japanese.

There are, however, a number of possible justifications for the translation into Japanese by Shindo of van Swieten's commentary without a translation of the Boerhaave original. Van Swieten's five-volume work of over thirty years' research and annotation commenting on a one-volume original certainly transmitted much more to the Dutch-style physicians than a direct translation of Boerhaave's far briefer *Aphorismi*, published in 1709, could have done. Further, since Boerhaave's original work emphasized the theory and philosophy of medicine and since the Japanese physicians trying to utilize Western medicine were weakest in those areas, they were undoubtedly able to derive much more value from Shindo's translation of van Swieten. Since the original *Aphorismi* was already well over a century old when Shindo undertook the translation of van Swieten's commentary, the progress of developing in Japan a comprehensive view of the status of Western medicine was undoubtedly facilitated by making available all of the data in the more recent work of van Swieten. One additional practical observation is that, as far as can be ascertained, the Dutch translation of *Aphorismi* itself simply never came into the hands of the *Rangakusha*, another instance where chance availability of sources determined the course of the history of Western medicine specifically and of Western learning generally in Japan.

For reasons which are not entirely clear but perhaps because of its great length (21 Japanese volumes), *Manbyo chijun* was never published and had only a very modest circulation in manuscript form. The work also had limited practical value in direct clinical application since it was predominantly philosophical in nature, and perhaps this factor too contributed to its remaining unpublished. At any rate, *Manbyo chijun* was used as a textbook by Shingu Ryotei in his *Junseishoin* together with two of his own abridged translations, *Ketsuron* (Treatise on blood) and *Seirisoku* (Rules of physiology), from the Dutch translation of Boerhaave's own *Institutiones medicae*.³ For his students, Shindo summarized *Manbyo chijun* in what has been

called the first work on diagnostics in Japan: *Shinko taigai* (Overview of diagnosis) (1826). Again, this volume was not published but was used in manuscript as the basic text at Nisshudo.

Despite Shindo's careful attention to Dutch grammar as evidenced in his *Shobunten* (Brief grammar) which he prepared for his students based on the works of the Dutch grammarian Petrus Weiland (1754–1841) (e.g. *Nederduitsche spraakkunst ten dienste der scholen*), there were many problems for him in translating van Swieten. For example, he simply transliterated the word *natuur* by putting together the Chinese characters 那去爾. Later he chose a Buddhist term *honzen* and finally *shizen* which is now the accepted translation of *natuur* into Japanese.⁴ The Greek word *physis* which was used to express the basic concept of European medicine also presented great difficulty. Again, Boerhaave's ideas on cytology and the microscopic theory were extremely complex for Shindo to convey given the lack of an experimental tradition in Japan.

Thus, with the work of Shindo inspired by Udagawa Genshin who had learned of Boerhaave from Otsuki Gentaku, the introduction of the Leiden School of medicine and its progenitor Boerhaave into Japan was completed. That the founder of the tradition should be introduced after his disciples or that the Leiden School had already been surpassed by more recent medical theories in Europe seems to have had little importance for the Dutch scholars of Japan. However, since theory had in the past always been either passed over or misunderstood in favour of practice, the patchwork quilt which Western-style medicine had become seems to have mattered minimally to its Japanese practitioners.

Certain other specific achievements of Shindo are worthy of note. It was he, for example, who first introduced the European methods of reasoning known as induction and deduction. It was Shindo, too, who for the first time made clear to Japanese physicians that pathology as understood in the West was entirely based on dissection as a scientific technique. And it was also Shindo who introduced the theory of germs into Japan in connection with his discussion of epidemics. In the latter instance his work seems to have derived from the ideas of the brilliant English physician Thomas Sydenham (1624–89) whose views were especially well regarded by the Leiden School.

Among Tsuboi Shindo's most important pupils were Ogata Koan (1810–63), Sugita Seikei (1817–59) and Kawamoto Komin (1809–71). Sugita Seikei was the grandson of Sugita Gempaku and the son of

Sugita Rikhei (1786–1845), himself a Dutch-style doctor and translator.⁵ In the field of medicine, Seikei contributed *Chokokiyohor-yakusetsu* (Explanation of the use of the stethoscope) (1850); *Saisei sampo* (Three chief remedies) (1849), a translation of the section with the same title from the Dutch version of C. W. Hufeland's *Enchiridion medicum*; *Chito shinketsu* (The true secret of curing smallpox) (1849), a translation of the chapter on inoculation in the Dutch translation, *Waarneemingen over de natuurlijke en ingeente kinder-pokjes, over verscheidene ziekten der kinderen, en zowel over de geneeskundige behandeling, als over den leefregel der kinderen* (Utrecht, 1802), from the German original by C. W. Hufeland; *Saisei biko* (Treatise on saving lives) (1850), a partial translation of the 1847 Dutch version, *Over den invloed der inademing van den zwavel-aether op menschen en dieren*, of the German of J. Schlesinger. As an official translator for the Bakufu, having been appointed to the Banshowagegoyo in 1840, Seikei translated *Oranda kokken* (The Dutch national constitution) (1843) and worked together with Sugita Rikhei, Udagawa Yoan, Mitsukuri Gempo and the Nagasaki interpreter Shinagawa Umejiro (Nagayasu) (1807–57) on *Kaijo hojutsu zensho* (Complete book of maritime gunnery) (1843) based on *Leiddraad bij het onderrigt in de zee-artillerie* (Delft, 1832) by J. N. Calten.

Kawamoto Komin was a physician of the daimyo of Kuki and a son-in-law of Aochi Rinso.⁶ In addition to having been a pupil of Shindo, Komin had studied under Adachi Choshun. Since Komin lived until 1871, many of his writings appeared after 1853. *Kikai kanran kogi* (*Kikai kanran* broadened) (1851–8) was a translated and enlarged version of his father-in-law Aochi Rinso's 1827 *Kikai kanran* which was based on Johannes Buys, *Natuurkundig schoolboek*. However, while Rinso used the first edition of Buys (1800), his son-in-law utilized the 1828 edition.

Perhaps the most important of these private schools where Dutch learning was taught was the Tekitekisai juku (usually abbreviated as Tekijuku)⁷ in Osaka at Kawaramachi founded by Tsuboi Shindo's pupil Ogata Koan.⁸ Koan was the youngest child of an Osaka attendant of the Kinoshita family, daimyo of Ashimori in Bitchu. Koan first began to study medicine at the age of 15 at Osaka where he became a disciple of Naka Tenyu, and, despite his poverty, he determined to go to Edo to further his medical education. Arriving penniless at the capital in 1831 Koan was taken in by Tsuboi Shindo, who recognized Koan's great talents. After some four years of study at Edo with

Shindo, Koan went to study in Nagasaki in 1836. At Nagasaki, Koan was especially impressed by his contact with the aforementioned Dutch physician Johannes Eddewin Niemann. In 1838 Koan returned to Osaka and opened a medical practice and established his own school.

Koan's translation activity included *Byogaku tsuron* (Introduction to the study of illness) (1849) which marked the beginning of pathology in Japan.⁹ Another published translation for which Koan was widely known was his *Hu-shi keiken ikun* (Record of the teachings of Hufeland based on his experiences) (1842–57). This work was based primarily on practical sections of the 1838 Dutch translation of Hufeland's *Enchiridion medicum*.

Koan's Tekijuku had more than 600 students from all over Japan¹⁰ and included among its graduates educators, physicians and politicians. Although Ogata Koan, like Ito Gemboku, was a practising physician in addition to being a schoolmaster, and the teaching of medicine was his main aim, his school programme was far from being solely a medical one. According to Nagayo Sensai (1838–1902), a student at Tekijuku, in his *Shoko shishi* (Personal record of Shoko):

Originally *Tekijuku* was said to be a medical school; in truth it was a place to read and understand Dutch books; among the pupils there were not only physicians but all men who came there to obtain Dutch scholarship whether artilleryists, botanists, or chemists.¹¹

The same work gave some idea of the way these studies were pursued:

For reading in turn the students are divided into eight classes, and each class meets six times a month. They determine their seating order for that day by drawing lots. The person in seat number one first reads several lines from the original, and he puts a question to the next seat and so on down to the last seat. For every question the chairman judges the outcome and gives a white mark for a correct answer and a black for an incorrect one. The principal of the school, examiners, and persons from the top class divide up the duties as chairmen according to the standing (high or low) of the class in session. When the person in the first seat finishes his chore of reading, the class is over for that day. After one month the marks are gone over, and the one with the highest number of white marks goes to the head of the class with a corresponding rearrangement of seating. One who occupies the top seat for three months advances straight to a higher class. In winning and losing at reading in turn, although there is a great struggle for personal honour, each one gains his understanding by relying on the written text, and all strive for learning. The work used for these readings is kept in the possession of the teacher, and since there is only the one book, the members of the same class copy it in turn. Since the beginning students do not know one word aside from articles, preposi-

tions, etc., they take the words from the dictionary one by one. However, although a dictionary is essential, there is only one copy of 'Doeff'¹² in the whole school. There is a three-mat room called the 'Doeff' room, and there the dictionary is kept. No one part of it can be taken out. Since all of the students depend on it, the room is filled with a regular stream, so that with a continuous pulling to the right and left one cannot easily hold onto what is in one's hand. When during the day the students cannot successfully find the meaning of a word, many come at night to look up things. There were never evenings when one did not see lamplight the whole night in the 'Doeff' room.¹³

Despite the inadequate facilities for its study, Dutch learning at Tekijuku continued to make progress. Among the famous names of graduates of Tekijuku, many of whom were prominent in the Meiji Restoration, was that of Murakami Daizaburo (1823–82) from a family of physicians in Harima. Daizaburo also studied for three years under Ito Gemboku and eventually opened a school of his own at his home in Harima where one of his pupils was Eto Shimpei (1835–74), a Saga samurai who took an active part in the Restoration and who later led an abortive revolt against the Meiji government. Another product of Koan's school was Omura Masujiro (1824–69) who fought against the army of the shogun at the time of the Restoration. Other graduates included the same Takeda Isaburo who studied with Ito Gemboku; Sano Eiju (1827–1902) whose accomplishments encompassed the founding of a school for Western learning in his native Saga *han* and of the modern Japanese navy, as well as the organization of the Japanese Red Cross; Hashimoto Sanai (1834–59), the son of the Fukui *han* physician and a disciple of both Sugita Gempaku and Egawa Tarozaemon; Otori Keisuke (1832–1911) who, though an original supporter of the shogun, later entered the service of the Meiji government as director of the Nobles' School, minister to Korea and a member of the Privy Council; and the great educator and Westernizer Fukuzawa Yukichi (1834–1901). The same tendency to garner the greater proportion of the student body from among the *bushi* which was evident at Shosendo was also true of Tekijuku. From the registers it can be seen that the number of pupils from each fief accorded with the attitude of that fief towards Western learning. Two notable exceptions were Tosa, which had twenty-seven pupils at Tekijuku's sister school Dokushokenjuku, and Satsuma which had in its domain at one time or another almost all of the leading Dutch scholars and thus did not need to send many of its retainers away to study.

There was a great deal of freedom at Koan's school contributing greatly to the establishment of what for Japan was unique – the

premise of free inquiry. Although the majority of the pupils were of the military caste, they pawned their swords in order to acquire funds for furthering their education, and in the school itself the concept of community property predominated. According to Fukuzawa Yukichi:

If anyone had looked into our inner hearts, he would have found there an untold pleasure which was our consolation. In short, we students were conscious of the fact that we were the sole possessors of the key to knowledge of the great European civilization. However much we suffered from poverty, whatever poor clothes we wore, the extent of our knowledge and the resources of our minds were beyond the reach of any prince or nobleman of the whole nation. If our work was hard, we were proud of it knowing that no one knew what we endured.¹⁴

When looked at from Yukichi's viewpoint, these were members of the warrior class who pursued their studies diligently without anxiety for the future. This was in line with Ogata Koan's statement, 'I educate true scholars of Western learning.'¹⁵

In the overall history of *Rangaku* perhaps the most important of the private schools was that of the remarkable German physician and natural scientist Philipp Franz von Siebold (1796–1866). Von Siebold, a member of a celebrated German medical family from Würzburg, served in Japan as physician to the Dutch from 1823 to 1830, and was given unusual freedom to do research as a result of special intervention by the *opperhoofd* who described von Siebold as a famous European scientist!¹⁶ From 1824 to 1828 von Siebold maintained a school known as Narutakijuku at Narutaki about 2 kilometres from Nagasaki, and from this school his teaching and his influence spread throughout Japan.

The school was established with the assistance of the Nagasaki interpreters whose help was essential since von Siebold knew almost no Japanese. From the outset the interpreters Yoshio Kosai (1788–1866), Yoshio Gonnosuke,¹⁷ Nakayama Sakusaburo (1785–1844), Narabayashi Eiken and his brother Narabayashi Soken (1802–52)¹⁸ were especially helpful to von Siebold in the founding of Narutakijuku. At his school over fifty young Japanese in their 20s and 30s studied Western medicine and natural science with von Siebold directly,¹⁹ and at least another fifty had contact with him either at Narutaki²⁰ or during his visit to Edo in 1826. Narutakijuku was the only example during the *sakoku* period of the provision of any systematic instruction in the knowledge of the West by a foreigner in Japan,

with the possible exception of the direction which Hendrik Doeff gave to the compilers of the *Doeff Halma* at Nagasaki.

While von Siebold instructed his pupils in various branches of medicine, botany, astronomy, geography, physics, chemistry, etc., he, in turn, was carefully collecting from them extensive knowledge not only about Japanese flora and fauna but also about Japanese society, history and culture. In fact, for those pupils of Narutakijuku who wished to be awarded a so-called *Doktor-Diplom* von Siebold required of them a graduation thesis (*Dissertatio inauguralis*) on a subject which he assigned to them. The subjects were by no means limited to medicine but included a broad variety of topics on which von Siebold himself wanted information, e.g. aspects of Japanese civilization, geography, animals, plants and minerals. These theses could not, of course, be compared with their German university counterparts in length or in depth.²¹ Moreover, the diplomas awarded by von Siebold were of no academic value whatsoever, but the recipients treasured them as though they were licences to practise medicine. Von Siebold, for his part, was able to acquire through these *Dissertatio* more information about Japan than any Westerner had ever before accumulated and to use this material in his subsequent writing about Japan.²²

Many of von Siebold's students have already been referred to in the preceding chapters, and it would be inappropriate simply to list names. However, some of his most committed disciples were the three who accompanied him in 1826 on his journey to Edo: Ko Ryosai (1796–1846) who introduced von Siebold to Japanese *tengu* or goblins and who was the first Western-style ophthalmologist in Osaka,²³ Ishii Soken (1796–1861) and Ninomiya Keisaku (1804–62). Other prominent students at Narutakijuku included Habu Genseki (1768–1854), a pioneer in eye surgery, Mima Junzo (1795–1825), Oka Kenkai (1799–1839), Totsuka Seikai, Ozeki San'ei, Ito Gemboku, Ito Keisuke and Takano Choei.

Von Siebold's meteoric career as a purveyor of Western learning in Japan and as an assiduous collector of information about Japan ended disastrously in November 1828. For while von Siebold was in Edo in May 1826, accompanying the *opperhoofd* Jan Willem de Sturler (1773–1855) on the *hofreis*, the *tenmonkata* Takahashi Kageyasu provided von Siebold with a copy of Ino Tadataka's map of Japan, and in return von Siebold had given Kageyasu a book entitled *Aardrijkskunde voor zeevaart en koophandel*, a Dutch translation of the work of

James Kingston Tuckey (1776–1816), a British naval commander, explorer and geographer, and had inscribed the volume 'To Globius, the honourable doctor of medicine, as a remembrance from Dr. Ph. Fr. von Siebold, May 7, 1826'.

Although Kageyasu had believed that the exchange was an act in good faith on behalf of the advancement of science, once the actions of the two men came to light in 1828, the Bakufu reacted vigorously. Since the possession of such maps was strictly prohibited by the shogunate, von Siebold was immediately placed in a very difficult position, and all those Japanese who had been in contact with him were suspect. Von Siebold himself was placed under interrogation on 10 November 1828, and, though he had intended to leave Japan at the beginning of 1829, he was told by the Japanese on 28 January 1829 that he must stay on Deshima where he was to be interned.²⁴

During his internment von Siebold was busily writing letters to Dutch colonial officials in Java, to Japanese friends and to the Nagasaki *bugyo*. To the colonial authorities he protested his innocence, arguing that he had been made the victim of a quarrel between the astronomer Kageyasu and his draughtsman who believed he had been mistreated by Kageyasu and had used his knowledge of the gift of the map to von Siebold to avenge his personal grievance. Von Siebold also contended that the securing of the map was in no way a secret transaction and was in accord with his approved scientific research. His attempt to seek assistance from his Japanese acquaintances in high places is known by a letter which he wrote to Mamiya Rinzo (1775–1844), explorer of Ezo (Hokkaido), at Edo. Rinzo passed the letter to the authorities who returned it to von Siebold. Although such an exchange of letters was forbidden to anyone in von Siebold's situation, the Bakufu did not pursue the matter since they apparently believed that he did not know he was in violation of a shogunal regulation.

In an appropriately self-sacrificial gesture, on 9 February 1829, von Siebold offered himself to the Nagasaki *bugyo* as a permanent hostage. A report of this properly humble behaviour on von Siebold's part was forwarded to Edo seemingly resulting in a somewhat less harsh attitude towards the famous internee. Finally, on 22 October 1829 von Siebold was told that he could leave Japan, which he did on 2 January 1830 taking all his vast collection with him.²⁵

The principal Japanese victim of this so-called 'von Siebold affair' was the unfortunate Takahashi Kageyasu himself who died in prison

in 1829, possibly a suicide victim. When the matter of the map first came to light, the Banshowagegoyo was closed and thirty-eight other persons such as Yoshio Chujiro, Ko Ryosai and Ninomiya Keisuke who had been in close contact with von Siebold at Edo and at Nagasaki were arrested. Fear of further government repression clearly affected the work of many of the active *Rangakusha*. For example, Udagawa Genshin, his son Yoan and others working in the Banshowagegoyo sent a very nervous letter to the Bakufu stating: 'We had been translating Chomel's Encyclopaedia. We have no connection with the men captured in the Siebold-incident – Kageyasu TAKAHASHI and the interpreters. We are innocent. Besides, we are confident that our translation is of great value to our country. Please let us resume this translation work at once.'²⁶

Because of the panache of von Siebold and also because of the well-deserved repute which he gained in the West as a specialist on Japan in an era when he was literally alone in the field, the von Siebold affair has possibly been somewhat overlooked in terms of its significance for the course of Dutch studies in Japan. One continuing problem in evaluating the affair is that for lack of comprehensive Japanese sources both Westerners and Japanese have tended to depend on Western accounts of what happened. Von Siebold's protestations of innocence were accepted then by the Dutch government and to an unspoken extent by the Japanese government too as witness the Bakufu's decision to allow von Siebold to leave Japan. Most contemporary accounts also accept what is usually described as von Siebold's naiveté in being the recipient of the map from Kageyasu.

Viewed in retrospect, however, and considered in the light of the voracious way in which von Siebold was collecting every kind of information about Japan, one might justifiably conclude that an 'obscure' Bakufu rule against a foreigner possessing a map of Japan would not have been given much weight by him. Moreover, given the close personal relationship he had with Kageyasu, for it was von Siebold who had given Kageyasu the name 'Globius', von Siebold might not only himself have felt secure in accepting the map from an intimate friend, but he might also not have given enough consideration to the potential consequences for Kageyasu himself. Again, the evidence that an exchange between von Siebold and a prominent Japanese intellectual and government official took place in May 1826 and did not come to light until November 1828 could lead an impartial observer to the conclusion that some sort of subterfuge was involved,

especially since von Siebold was as public a personality as may have existed in Japan of the 1820s – a foreigner, a physician, a quasi-diplomat, a private-school headmaster, a compulsive collector of every kind of information about Japan, etc.²⁷

In addition, the von Siebold affair is significant as an indication of the dilemma presented to the Bakufu by the diffusion throughout Japan of *Rangaku*. The substantial number, widespread geographical origin and relative youth of the student body at the Narutakijuku demonstrated clearly the growing interest among the samurai class in knowledge from the West. Moreover, the very heavy traffic of the visitors to von Siebold in 1826 at Edo at the *Nagasakiya*, where the Dutch always stayed, could not have gone unnoticed by the shogunal authorities. Perhaps, not entirely unlike its reaction two centuries earlier to the spread of Christianity in Japan, the Bakufu, while continuing to recognize the utilitarian importance of information from the West, feared any potential erosion of its ability to control that information and its purveyors, Japanese or foreign. Von Siebold, again perhaps like certain of the outstanding Jesuits in the 'Christian century', was certainly far more active and assertive than any of his Dutch or even foreign predecessors had been. And, though the Japanese had given him permission to work away from Deshima at Narutaki, they had probably not anticipated the extent of his activities or the charisma of his personality.

Accordingly, the matter of the unauthorized receipt of the map of Japan by von Siebold provided the Bakufu with a convenient rationale, on the one hand, for curbing his somewhat free-wheeling involvements and, on the other hand, for reinforcing the government's control of *Rangaku* in all its facets. That these goals of the shogunate were speedily attained is evident from the confinement and expulsion of von Siebold, the unfortunate but perhaps from the Bakufu's point of view convenient death of Takahashi Kageyasu, the subsequent release from detention of all the other detained Japanese and the reopening of the Banshowagegoyo in 1830. Dutch studies continued to grow, but their officially circumscribed limitations had been forcefully re-emphasized, and the Bakufu's authority over information obtained from the West through the Dutch, as well as over every Japanese participant, particularly those in private schools, in obtaining that information, remained substantially unquestioned.

Another private school which advanced the progress of Western learning was the Tanseido of Minato Choan (d. 1838). Choan was one

of the leading disciples of von Siebold and as such contributed *Shiiboruto keikenho* (von Siebold's method of experiment) (1825). In 1833, he was called into the service of the Bakufu by the *roju* Aoyama Tadayasu (1768–1836) as an astronomer and translator.

The Bakufu physician and surgeon Totsuka Seikai (1799–1876) from Kakegawa studied under Udagawa Genshin and von Siebold. In 1832, he opened a medical practice at Edo Kayabamachi where pupils also gathered from all over Japan. At Edo Totsuka Seikai together with Ito Gemboku and Tsuboi Shindo were known as *Sandai Ran-poka* or 'The three great Dutch methodologists'.

The increase in these schools year by year in the number of samurai students from various fiefs was in direct proportion to the growth of the importance of defence brought about by the growing pressure of foreign affairs. Yet despite the outward reasons for attendance at these schools, the result was an amazing spread not only of the factual aspect of Western learning but perhaps for the first time of some of its spirit as well. Though the majority of these men returned to their fiefs and were promoted or were given appointments by the Bakufu, these positions served as valuable stepping stones for the diffusion of information from and about the West as well as of Western ideas. Thus no study of the influence of Dutch studies in Tokugawa Japan would be complete without the inclusion of these private schools where so many future leaders of the Meiji Restoration received their education.

XIV

Rangaku and Tokugawa intellectual ferment

Having considered in broad outline the concrete aspects of the development of Dutch studies during the Tokugawa Period, it is necessary to devote some further attention to certain 'ideological' conflicts which involved the proponents of Western learning. The realm of ideas, to be sure, is at best often conjectural. Nevertheless, in any overall view of the Dutch impact on Japan, consideration must be given to the effect of knowledge of the West on the thought processes of those men who espoused that knowledge. This chapter then will be concerned with a further discussion of the attitudes of certain *Rangakusha* towards Confucianism and Buddhism, of their criticism of the written Japanese language, of the controversy between the so-called 'orthodox' Confucianists and the *Rangakusha* – the *Bansha soyaku* (Calamity encountered by the *Bansha* (scholars concerned with the 'barbarians')) or the *Bansha no goku* (Imprisonment of the *Bansha*) of 1839 – and of the so-called 'open country' debate.

As has been detailed above, Western learning in Tokugawa Japan consisted primarily of research in the natural sciences and until the last years of the shogunate was only minimally concerned with European philosophy or social or political science. Investigation of Occidental social conditions did not often go beyond simple geographical knowledge and rarely involved any study of European political systems or of the reasons why the geographical situation (boundaries, etc.) existed as it did. In the field of natural science the Bakufu had attempted, and with some success, to relate Western studies to such immediate applications as the increase of agricultural production and the building up of coastal defences. The official ideal was to keep these practical aspects completely separate from Western abstract philosophy in order to maintain the indivisible philosophical base of Confucianism and its concordant political and economic theories.

The first significant thinker to articulate this important distinction was, of course, Arai Hakuseki who, as noted in chapter V, while realizing the importance of Western science emphasized the need for a

separation of the concrete and the abstract. This division – the West for the concrete, the East for the abstract – was adopted wholeheartedly by the Tokugawa government, which saw Western science as a sort of frosting for the cake, i.e. something which might be used where it was thought necessary to fill in or elaborate upon the basically sound Confucian structure. Yet the weaknesses of this dichotomy became evident to some *Rangakusha* as Western science diffused throughout Japanese society.

The two main points on which such critics attacked the traditional *Weltanschauung* of Buddhism and Confucianism were: (1) the permanent and formalized nature of the two philosophies which did not seem to permit changes in accordance with the times, and (2) the unsatisfactory explanations of natural phenomena in both Confucianism and Buddhism. Neither of these was necessarily a new argument, but for some of those Japanese who had acquired a familiarity with Western science such concerns were more pressing than they had been previously. Accordingly, certain scholars of things Dutch made good use of their knowledge of the West in indicating deficiencies in the 'orthodox' ideologies.

However, it must be pointed out that there was an inherent paradox in the viewpoint of these critics in that, on the one hand, even among many committed Confucianists the utility and accuracy of European science were accepted and, on the other hand, most of the *Rangakusha* unquestioningly accepted the superiority of East Asian abstract thought. Moreover, the greater part of the critical comments did not come from 'mainstream' Dutch scholars but from those who were so much on the periphery that there is even now doubt whether they can be, in fact, called *Rangakusha*. And in the instances of even those critics, an ambivalence persisted which prevented them from becoming truly anti-Confucian or, at best, un-Confucian.

For example, Hiraga Gennai (1729–79) who was condemned as a heretic by orthodox Confucianists, wrote, 'Every country does not have the way of the five relations . . . and in all the universe there are no better teachings than those of the Sage'; Shiba Kokan stated, 'Persons great and small must learn together the Way of the Sage', and urged that Confucian precepts be used in ruling the country; in ethics Yamagata Banto adhered to Confucianism and contended, 'In the moral character of mankind we must take principally the wisdom of the ancient sages'.¹ Of course, as the critical opinions of these writers are examined in the paragraphs that follow, what cannot be known is

the extent to which they offered such words for their own self-protection in order to mitigate their strongly articulated, almost pro-Western views on many matters.

Hiraga Gennai was a native of Sanuki where he received an appointment from the daimyo of Takamatsu, Matsudaira Yoritaka (1711–71). In 1761, with Yoritaka's approval, Gennai left his service and began to travel. He advised several feudal lords on how to enrich their lands, and his name became well known throughout Japan. In the course of his peregrinations Gennai studied at Nagasaki with Yoshio Kosaku and learnt botany from Tamura Ransui (Motoo)² (1718–76), probably the leading botanist of eighteenth-century Japan. Ransui and Gennai held two joint exhibitions of products in 1757 and in 1762 at Yushima, Edo. Among the more than 1,300 varieties displayed, Gennai recorded several hundred in *Butsurui hinshitsu* (Kinds of things and their qualities) (1763).

Gennai had very wide-ranging interests in addition to botany. He is supposed to have been the first Japanese to learn Western painting. He dived into zoology, relying on a copy of the Dutch translation of Johnston's animal sketchbook, and mineralogy, discussing the potential development of coal mines in Chichibu and copper mines in Akita. In 1765 he published *Doshokukobutsu jippu* (Ten stories of animals, plants and minerals). In addition, he commissioned translations to be done for him, having Yoshio Kosaku do an abridged manuscript translation of Dodonaeus's *Cruydeboeck* and urging Motoki Ryoei to do a translation, *Honyaku Oranda honzo* (Dutch botany translated) (1771 unpublished), of an illustrated botany book by Emmanuel Sweerts (1552–1612).³ Gennai also worked with asbestos, and in 1765 wrote and published *Kakampu ryakusetsu* (Brief explanation of asbestos) based on the article on asbestos in the Dutch translation of the German encyclopedia *Gazophylacium medico-physicum* . . . of J. J. Woyt. Ginseng, sugar refining and even electrical devices were investigated by Gennai. He also introduced sheep-breeding into Japan and experimented with woollen textile weaving. This remarkable Japanese 'Renaissance man' also made ceramic pottery in addition to being an accomplished novelist and playwright!

Although his activity took place before the Dutch language was well known in Japan, Gennai was deeply impressed by Dutch studies and his world-view came to be influenced by his knowledge of European natural science. At that time Yoshimasu Todo's school of ancient-

style medicine (*kohoka*) was emphasizing practice and empiricism rather than logic, yet Gennai strongly criticized the 'blind physicians who are called "ancient-style"', saying,

Our doctors today remember how to write Chinese poems. . . . Though they call themselves such things as 'Confucian doctors' or 'old stylists', they do not see illness; they do not recognize illness; they do not remember medicines; they prescribe remedies recklessly; and they kill.⁴

Gennai criticized the Confucianists for believing anything written on paper or read in a book.⁵ He also attacked the Confucianists for their infatuation with 'ancientness' which they embraced in their writings and scholarship. He said that they depended too much on meaningless witticisms and that they were conventional, imitative and overly dogmatic. He stressed the necessity for Japan to build its own scholarship free of Chinese influence. Moreover, he assailed what seemed to him to be the foolishness and unscientific attitude of Buddhism.

Gennai was an ambitious and greatly talented man who quickly tired of a small stipend in a minor fief. Though he asked help in securing a more profitable post, he was forbidden to apply for a position in another fief and became a *ronin*. Gennai, having experienced what he perceived as the contradictions of the feudal system, became a writer who viewed his world sceptically. It was undoubtedly that same scepticism which fuelled his anti-Confucian and anti-Buddhist outbursts as well as his seemingly limitless curiosity about the West. However, Gennai's position in his society remained marginal. While this apparently provided him with a marked degree of latitude in expressing independent views, at the same time his views were never taken very seriously by his contemporaries.

Shiba Kokan came out of a far more *Rangaku*-oriented atmosphere than that of Hiraga Gennai. Kokan was an enthusiastic follower of the work of Motoki Ryohei and Shizuki Tadao, and he himself wrote many useful books on astronomy.⁶ Then, too, as a pioneer of both oil painting and copper-plate etching, he came in contact with still more aspects of Western culture. The approach of Shiba Kokan towards Confucianism was that Confucianism had at that time lost its essence and should revise its outlook. According to Kokan, the fact that in Japan no one knew that the earth revolved about the sun, since the Confucianists espoused the 'narrow' view of the Classics, proved to him that in contrast to the West, 'China and Japan have no science'.⁷

Kokan was extremely antagonistic to Buddhism, saying, 'Buddhism is not something to be studied; it is a false doctrine'.⁸ He stated that Buddhist writings were foolish and merely a convenient means of influencing the minds of ignorant people. Kokan argued that modern Buddhists did not realize this and unthinkingly accepted classical parables as the truth. He called those who had first introduced Buddhism into Japan 'stupid fools in natural principles'.⁹ Kokan even tried to explain Buddha's view of the universe by means of his own natural scientific *Weltanschauung*. Following this line of reasoning, he said that to attain Buddhahood a man need not become a priest, shave his head or even enter a temple, but should just feel the emotion in his heart. Originally in Buddhism everyone had Buddhahood within himself. Therefore, said Kokan, any person regardless of origin can achieve a state of non-desire. He went so far as to make some superficial investigation of Christianity in the hope that it might complement the scientific knowledge of Europe. However, he concluded that Christianity and Buddhism were actually quite similar and that perhaps Buddhism was a later version of Christianity transmitted to the Orient by Sakyamuni. According to Keene:

In the end he abandoned . . . Buddhism and Christianity alike as foreign. Confucianism and Shinto also attracted him for a time, but the behaviour of professional Confucianists alienated him from that philosophy, and his reason made him see through the primitive nature of Shinto.¹⁰

While it is difficult to conclude that Kokan was a true malcontent, at the end of his life, Kokan, saying that he was tired of art, Dutch studies, science, etc., became a convert to the doctrines of Taoism, probably the most mystical and non-logical of the great Sinic religious philosophies. This was certainly a startling contradiction of the seemingly positivist spirit which had characterized his life up to that point. Yet when viewed in the light of his constant examination and rejection of the several philosophical systems into which he had delved, it is perhaps not so strange that he should find comfort in the Tao.

Since both Gennai and Kokan were really outside the mainstream of *Rangaku*, it is difficult not only to classify their involvement with knowledge from the West, but also to discern the extent of the possible influence on other intellectuals of their somewhat unorthodox views. Both men were considered rather eccentric and thus were more curiosities than scholars of real stature in their own times and

milieux. For officialdom, too, their 'unorthodoxy' was insufficiently significant to arouse concern and insufficiently influential to prevent their work from being published.

Yamagata Banto¹¹ received a Confucian education under the tutelage of Nakai Chikuzan (1730–1804) at the latter's school, Kaitokudo. Banto even professed to be a follower of Chu Hsi. Yet as a *Rangakusha* his concern with the inapplicability of Confucian principles to current problems is evident. In his writing Banto questioned the basis of Confucian government, economics and morals. He disregarded classical history and said that addiction to Chinese poetry was foolish. Banto energetically responded to Western science with such statements as:

There is nothing in the world past or present like the detailed astronomical studies of Europe. Who can dispute them, especially since the facts were discovered by actual observation around the world.¹²

That very strange Western theory completely explains the universe. The narrow viewpoints of China, India, and Japan cannot match it. We must carefully take it to heart and think very well of it.¹³

Banto apparently approved of Buddhism in its original form since he believed that it had been spread in India to save humanity. However, according to him the parables had lost their true import by the time of their widespread popularity in Japan and came to have the grievous result that in seeking comfort one could go to the extreme of discarding one's wealth, destroying one's occupation and leaving one's native place, wife and family. Banto also decried the errors of geography evident in the Buddhist sutras. He wrote: 'All of the Chinese and Japanese scholars are addicted to these theories, and it must be pitied that they believe in Buddha without thinking. The bad habits of the Buddhists have come to this. . . '¹⁴

Not only did Banto criticize Confucianism and Buddhism, but he praised the investigative aspects of Western culture. He pointed to the eagerness of the Occidentals to discover the best methods of doing things and to profit by their discoveries as the reasons for their successes and progress. According to Banto:

The Chinese and Japanese cannot reach the minuteness of the Westerners in the various skills; even if the Chinese and Japanese have the desire to do so, they are so burdened by making a living that they cannot afford the special devotion necessary to the study of those skills. This is the reason for the great divergence between East and West. Now that Japan is obtaining this knowledge for the first time, it is to be praised.¹⁵

The appearance of such ideas as are exemplified in the 'critical' writings of scholars like Gennai, Kokan and Banto can, of course, only be understood in the context of the era in which they lived. Of the three men, perhaps Yamagata Banto was the most outspoken in his view of the need for investigation of natural laws and in his denunciation of concepts of the existence of deities and of the immortality of souls. Banto's joining together of Western learning and atheism may be compared perhaps to the European post-Renaissance union of science and philosophy. His materialistic outlook may perhaps be thought to be an understandable extension of the Chu Hsi school which opposed deities and Buddhism. Yet even if it were simply an extrapolation of Neo-Confucian ideology, Banto's knowledge of Western learning clearly conditioned this, and as seen above he was not uncritical of certain Confucian precepts.

Even mild criticism of Confucianism did not mean anti-feudalism, however. The kinds of criticisms evident in the writings of Gennai, Kokan or Banto were not criticisms of the system, nor were they really at all political in nature. In fact, what these men saw themselves doing was contributing to the strengthening of existing institutions by revealing certain of their weaknesses and by recommending ways in which they could be improved. Accordingly, even their denigration of aspects of Confucianism should be seen solely in the light of the advances being made in Japan in medicine, astronomy, geography, etc., which had convincingly demonstrated the practical value of information from the West.

Thus, Western-derived technological progress produced an atmosphere in which not only Confucianism specifically might be questioned but Chinese civilization generally. Greater knowledge of the people, customs and culture of the Occident tended to weaken the conventional Japanese belief that China and Japan composed the civilized world. For example, Honda Toshiaki's statement that Japan as a sea-girt island country was foolish to model itself after a continental nation like China was a typical thrust at the restrictive nature of Chinese thought. The attack on the Chinese 'central-country' geographical concept was another, and the Chinese idea of foreign 'barbarians' was perhaps to some extent mitigated by Western scholars. Further, the mythical geography of the Buddhist sutras was forced to meet the increased criticism brought on by the dissemination of the new information.

Possibly in no other field was the assault on things Chinese more

clearly defined than in the argumentation among some Dutch scholars on the inconvenience of the employment of Chinese characters. Those who were familiar with Western writing bemoaned the complexity and number of Chinese characters and pointed to the valuable time spent by Japanese scholars in learning them – time which otherwise might be devoted to research. Even the Hollanders noted that it seemed easier for the Japanese to acquire Western learning than their own.

The works of Goto Rishun who first introduced in print the simplicity of Western writing and of Morishima Churyo who compared the inutility of Chinese characters with the serviceability of the Dutch alphabet have been described earlier. Shiba Kokan was surprised to find Western languages prevailing throughout the world and praised their directness. He believed that the added burden of learning thousands of Chinese characters had played an important part in the failure of the Japanese to develop a scientific attitude. Kokan wrote:

The Western nations, instead of characters, use signs which merely indicate the pronunciation. Is it not a waste of time to read books first without understanding the meaning and only then to ask a teacher about it? Since in the West they use the sounds of their own language in writing, they have but to look at a book if they want to learn about the principles of heaven and earth. It is like reading Japanese *kana*. There is never a distinction made between elegant and common language. Thus one can learn all the fundamental principles without having need of a teacher.¹⁶

Accordingly, Kokan became a strong proponent of the use of the native Japanese syllabary, *kana*, in place of *kanji* (Chinese characters).

Honda Toshiaki also advocated that the Japanese use *kana* instead of Chinese characters although he believed that the Western alphabet was even more preferable. He said that Chinese characters were too numerous and not applicable in the conduct of foreign affairs, while Western letters were few in number and easy to learn. The Japanese *kana*, while better than the complex *kanji*, noted Toshiaki, were still too many in number and incapable of representing all the sounds with which the Occidental alphabet was endowed. He especially criticized the barrier to the rapid assimilation of scientific knowledge which the language problem presented.

Similarly Yamagata Banto visualized for the Japanese a lifetime consumed in language work with no time for astronomy, geography, etc., as opposed to the facility with which Europeans obtained such knowledge. All of these commentators agreed that since East Asian

scholars had to be linguists first, little time remained for scientific study. The significance of this controversy well over a century and a half ago can be seen in the light of the continuing struggle in modern Japan at least to limit the use of Chinese characters. Not too surprisingly the arguments today are practically the same ones which were advanced by the *Rangakusha*, namely that the great amount of time which must be assigned in the schools to language study leaves fewer hours for other subjects which tend to develop free and inquiring minds.

For their part, the traditional Confucian scholars whose position had been benevolently protected by the Bakufu during the previous two centuries continued to oppose Western learning and even intensified their attacks upon it. Those who espoused orthodox Confucian ideology were at best disinterested in Western culture, since they had ancient Chinese precepts fixed in their minds. Moreover, their standing under the shogunate depended on the perpetuation of these concepts, and a tendency developed to try to deny even demonstrable scientific truths from the West. Such data as the world being round, heliocentricity and the existence of five continents were denounced as evil falsehoods. The Confucianists said that Western physical theories insulted natural laws, and they criticized scientific devices as strange and wicked.

In the 1830s and 1840s the increasing appearances of British and American ships off the Japanese coasts, plus the reports of Great Britain's overwhelming victory in the Anglo-Chinese Opium War, gave renewed attention to the question of foreign affairs. Accordingly, the *yogakusha* came into greater prominence as a result of their acquaintance with the world of the West. But the Confucianists continued to reject and oppose the views of these 'upstarts', and in their antipathy towards Western learning many Confucian scholars evidenced the belief that Western knowledge must be suppressed since it was the subversive forerunner of Western religion, which could only make the Japanese prisoners of the Occidentals.

Originally the ban on Christianity had been promulgated by the Tokugawa in order to protect the Bakufu from a possible internal threat to its supremacy. This move had the additional purpose of defending the country against Western encroachments. Despite the complete changes in European relationships and governments wrought over 200 years, and despite the fact that reports by Dutch scholars failed to demonstrate any inherently dangerous character-

istics in Christianity, some orthodox Confucianists held to their belief that the Westerners would make use of Christianity to invade Japan. To the extent that all Western scholarship was considered a tool of the religion of Christ, the work of the *Rangakusha* was subjected to oppressive scrutiny.

The Confucian viewpoint which stated that even Western maps should be considered as related to Christianity gained followers like the Utsunomiya Sinophile Ohashi Totsuan (Junzo) (1816–62) who expressed violent anti-foreignism in *Hekija shogen* (Brief words on driving away evil). The whole of the *Hekija shogen* was devoted to an impassioned attack on the Western scholars from the viewpoint of the orthodox Chu Hsiists. Totsuan felt himself to be ‘a witness for truth and righteousness’,¹⁷ and in that spirit assailed what he believed to be the false natural philosophy of the Occident. Perhaps one can to some extent assess the success of the *yogakusha* by noting the bitterness evident in Totsuan’s writing:

Followers of the Western learning . . . call themselves natural philosophers, shamelessly saying that the West knows the law of the universe. They are rebels who exhibit a forged seal of state and gather a vile rabble. True disciples of Confucius and Mencius should raise their banner, expose the counterfeit, and destroy these false scholars, that they may get their just reward from the spirits of the former Sages dwelling in Heaven. But scholars do this not. They join the rabble, praise Western learning and pierce the Sages as with a sword.¹⁸

One can also assume some knowledge of Western astronomical information by noting Totsuan’s vilification of the scientific explanation of natural phenomena, a trend which he obviously considered a threat to the position of the officially sanctioned followers of Neo-Confucianism. He complained:

Consider eclipses, for example. They follow law, and may be calculated so that men come to fear them not. Not so the Sages, who revered Heaven. The sun is the essence of the great Yo and ever gives light. Whether it lose its light according to law or unexpectedly is it less a change in Heaven? Surely the filial son does not talk and laugh when his parent is ill, merely because the illness is periodical! So when an eclipse occurs, he who reverences Heaven beats a drum, makes his offering, fasts, stops all music as did the Sages in ancient days. But nowadays all say that eclipses are ordinary things and not to be feared. . . . The Sages’ teaching that we should examine self is thought folly and Heaven too is scorned. Truly it is cause for the deepest grief. The evil comes from measuring Heaven and knowing not its heart.¹⁹

Despite such extreme viewpoints, there were those like the *kogakuha* Neo-Confucianists who regarded astronomy, Eastern or

Western, as unimportant in the context of Confucian moral values and thus not in conflict with them. Moreover, Japanese Neo-Confucian flexibility in regard to Western learning was facilitated by the often repeated view that the Confucian system was strengthened, not weakened, by the utilization of Western technology. Further, a commonly held opinion among many orthodox Neo-Confucians in Japan was that so-called Western learning had, in reality, originated long ago in China and had simply reached Japan via the West. Obscure passages in the classics were even quoted in an effort to sustain such a rationale.

Perhaps the greatest criticism levelled by the so-called 'orthodox' philosophers at the advocates of Western learning was the supposed tendency to worship foreign countries and to deprecate Japan. In 1825, Aizawa Yasushi (Seishisai) (1782–1863), a Confucianist from Mito, wrote *Shinron* (New essay) in which he said that Dutch scholars were too infatuated with the West, as seen in their praise and admiration for it, and he stated his belief that their descriptions of the wealth and power of Europe and America could only lead to their despising their own motherland, Japan, and to consorting subversively with foreign states.

Another Mito scholar, Fujita Toko (1806–54), condemned not only the *Rangakusha* but the Dutch themselves. According to Toko, the fact that the Dutch were permitted to trade with Japan had been a mistake since the Japanese were both polluted by developing a taste for useless and debilitating foreign luxuries and were threatened by Holland's having been overwhelmed by Roman Catholicism! 'Aah! The Holland of today is not the Holland of yesterday!'²⁰ Accordingly, the *Rangakusha* were nothing more than a new breed of heretics subverting Japanese purity with their addition to 'crab writing', as the Western alphabet was described by its denigrators.

Alarms occasioned by the outcome of the Opium War and the frequent appearance of unwanted Western ships in Japanese waters combined with the growing anxiety of Bakufu officials about the loyalty of the Dutch scholars. Tokugawa nervousness was seriously aggravated by these tensions which seemed to exacerbate both external pressures and internal rivalries. Such stresses and strains culminated in 1839 in the *Bansha no goku* affair.

Some years earlier a forward-looking Confucianist, Endo Shosuke, had established a circle for the discussion of politics and economics called the *Shoshikai* (Age-Veneration Society). This group

had among its membership a concurrent organization, the *Bansha*, which considered ways of improving Japan by the use of knowledge obtained from the West. Among its participants the *Bansha* included many samurai from the small and medium-sized fiefs, some *hatamoto* and even Bakufu officials. Among the famous names in the *Bansha* were Ozeki San'ei, Hatazaki Kanae, Suzuki Shunzan (1801–46), Watanabe Kazan (Noboru) (1793–1841) and Takano Choei (1804–50).

Suzuki Shunzan was fief physician to the daimyo of Tawara and being particularly interested in Western military science, wrote such books as *Heigaku shoshiki* (Short discussion of military science), *Kaijo koshu ryakusetsu* (Brief explanation of offence and defence on the seas), and *Sampei kappo* (Practical method of infantry, artillery and cavalry) (1841) probably based on *Grundzuge der Taktik der drei Waffen* by the German strategist, I. I. von Brandt (1789–1868).

Watanabe Kazan was the son of a samurai also of the Tawara *han*. Like many other samurai families of that time, the Watanabe family was impoverished by a severe reduction in its stipend, and in his youth Kazan was forced to contribute to his family's support by painting fans and lampshades which he sold. When he served at Edo, he studied art under some of the leading painters of his day and enhanced his reputation not only as a skilful artist but as a wit and scholar as well. The daimyo of Tawara selected Kazan as a personal intendant (*karo*), and in this position Kazan gained valuable experience in dealing with coastal defence and agrarian problems. In 1832 Kazan was placed in full charge of the sea defences of the Tawara domain.

Kazan had begun to know of the Western world through his contacts at Edo about 1820. He was subsequently one of the founders of the *Bansha* and encouraged their study of the history, geography and customs of the West. Although he himself collected Dutch books, especially on military logistics, and sponsored the translation of Dutch works on military science, gunnery and naval science, Kazan could not read the Dutch language. He would often have Choei and San'ei translate for him, and he would note down the main points as they went along.

Among his many writings was *Gekizetsu wakumon* (Dialogues with foreigners) (1838) which today might appear to be somewhat critical of conditions in Japan at the time the work was written. The title was an ironic one since it refers to a certain person asking questions of foreigners whose way of life is misunderstood by the Japanese. In fact,

in 1838 at Edo Kazan did interrogate through an interpreter the Dutch *opperhoofd* Niemann, and *Gekizetsu wakumon* is a record of that interchange, parallel perhaps to Arai Hakuseki's interrogation of Fr Sidotti.

Takano Choei was from a family of physicians at Mizusawa in Mutsu. At the age of 16, while supporting himself by giving massages, he took up the study of Western-style medicine and the Dutch language. Eventually he received a post with the daimyo of Hirado, for whom he translated numerous Dutch books on various phases of the natural sciences. However, in 1828 Choei's public career was seriously jeopardized by the von Siebold affair.

Since Choei had been a pupil of von Siebold, he fled to Kumamoto until the danger had passed. However, he had a great desire to learn more of medicine and of the West, and he determined to sever his connections with a particular fief and to settle in Edo where he could associate with other Western scholars and could devote himself to the services of Japan as a whole.

Among his early writings Takano Choei composed *Sansetsu yojoron* (Essay on health care according to Dutch sources) and two works which the Choshu merchant Kumaya Gouemon (1795–1860)²¹ had Choei translate into Dutch for presentation to von Siebold: *Aizome ni kanshite* (About indigo dye) and *Wase hanshuho* (Method of sowing early rice). In 1827, together with Oka Kenkai, Choei translated the Dutch version, *Kunst om het menschelijk leven te verlengen* (1799), from the German original by Hufeland as *Ransetsu yojoroku* (Record of the Dutch explanation of rules for good health). Choei produced a short work about 1830 entitled *Ensei suishitsuron* (Western theory of the nature of water), a treatise which demonstrated a sophisticated understanding of Western chemistry, including a definition of 'element', an explanation of the formation of acids, oxidation, etc. In 1832 Choei wrote and published a landmark book believed to be the first work on physiology in Japan, *Seisetsu igensuyo* (Western explanation of the fundamentals of physiology), based on the Dutch translations from the French of Joris de la Faye and from the German of T. G. A. Roose (1771–1803) and of Blumenbach. Among the diverse medical subjects of Choei's manuscript translations were such specialized matters as surgery, obstetrics, ophthalmology, pharmacopoeia, inoculation, syphilis, dysentery and breast dropsy.²²

The dangerous situation in which the members of the *Bansha* found themselves involved was occasioned by the rather complicated

'*Morrison* affair'. Charles W. King (1809–67), an American trader and resident of Canton, China, decided to sponsor the return to their homeland of seven Japanese castaways, three of whom had been shipwrecked on the coast of British Columbia and four others who had been driven ashore in the Philippine Islands. King undertook this repatriation in the hope that a 'favorable impression' might be made on the Japanese authorities and that normal trade relations might result. For his purpose King ordered the 564-ton unarmed brig *Morrison* to sail to Japan, and the ship set sail from Macao on 4 July 1837, with the seven repatriates on board.²³ When at the end of July the *Morrison* approached the Japanese coast, the Uraga *bugyo* ordered his shore batteries to fire at it. Though one cannonball did strike the vessel, no serious damage was done. However, the *Morrison* withdrew to the south and attempted to make contact with the Japanese at Kagoshima, where it was again driven away by coastal gunfire. Unsuccessful in its mission, the *Morrison* was back at Macao on 29 August.²⁴

For the next year the Bakufu remained ignorant of both the nationality of the vessel and the purpose of its visit. In July 1838, the Dutch informed the Nagasaki *bugyo* of the details of the voyage, and he in turn submitted a report to Edo which attributed English nationality to the ship and noted somewhat contemptuously: 'The primary purpose of the above voyage was, it is said, to repatriate seven shipwrecked Japanese; in truth, however, it was to petition for trade.'²⁵ However, the *bugyo* did ask whether the Hollanders might be permitted to return Japanese repatriates in the future, and to this the Bakufu consented. Nevertheless, the authorities determined that if any other foreign ships should come to Japan bearing castaways they must be driven off in accordance with the *uchi-harairei* of 1825, despite the charitable nature of their mission.

Knowledge of this affair reached the *Shoshikai* in 1838 through the medium of some notes secretly copied by Haga Ichisaburo, a secretary to the Hyojosho. From the garbled account which reached them, the scholars believed that a British ship would arrive in the near future and that the Bakufu was planning to drive it away. They stated accordingly:

That is inexpedient, and the Dutch report is probably in error. *Morrison* is not the name of a ship; it is a famous British statesman.^[26] Since he comes with the good intention of bringing castaways, to drive him away brusquely is not right; it is unreasonable and illegal.²⁷

In order to counter the anticipated Bakufu reaction to the arrival of the *Morrison*, Takano Choei published a pamphlet entitled *Yume monogatari* (Story of a dream)²⁸ in which he strongly criticized the conduct of the Tokugawa government. He began by giving a summary of the population, power and achievements of England plus a brief resumé of Sino-English trade. Next Choei gave a glowing description of the scholarly attributes and temporal power of this man Morrison. He then denounced the proposed driving away of the British ship as barbaric and inhumane, especially since Japanese subjects would be aboard the vessel. Finally he recommended that if the English were not received at Edo they should at least be cordially welcomed at Nagasaki and rewarded well for their kind treatment of the castaways. Choei also stated that the conduct of humane relations with the English could only have favourable results for Japan. Similarly Watanabe Kazan wrote *Shinkiron* (Essay on attention to an opportunity)²⁹ which, under the guise of encouraging the development of the sea defences of Tawara, covered much the same ground as *Yume monogatari*. Actually Kazan went somewhat further than his colleague, for he criticized not only Bakufu policies but also the inability of the officials themselves to deal properly with difficult problems.

Meanwhile the Confucian scholars and officials were extremely eager to bring dishonour down on the heads of the *Rangakusha* and to have them implicated as criminals. According to Bakufu regulations, the only method through which non-office-holders might try to influence the government was by means of presenting a memorial. Thus a sure way to arouse the displeasure of the officials of the shogunate was to publish independent viewpoints, as was done in *Yume monogatari*, or to permit the public to learn one's opinion even with publication, as occurred in the case of *Shinkiron*. Therefore, the appearance of these two works provided an excellent basis for the bringing of charges against the two authors and their fellow members of the *Bansha*.

The official most responsible for their plight was a devotee of Confucianism and a bitter antagonist of *Rangaku*, the *metsuke* Torii Yozo (1796–1874) who was himself confined for maladministration in 1854. Yozo claimed that the contents of the pamphlets proved that the *Bansha* was in communication with foreigners and that Kazan and others were secretly travelling to certain uninhabited islands off the Japanese coast where they were making contacts with the intention of

going to foreign countries. Then there was the additional charge that this was a widespread conspiracy involving many daimyo and samurai. The flimsy bases out of which these accusations were manufactured were two: (1) Kazan and his friends had vaguely discussed among themselves the possibility of poor farmers colonizing some uninhabited islands as one potential answer to the widespread agrarian distress and (2) all the *Bansha* group, of course, had close contact with the *Shoshikai*.

Nevertheless, Torii Yozo's machinations were successful, and in the summer of 1839 Kazan and Choei were arrested and imprisoned. Thanks to the endeavours of his many friends, Kazan was spared the death penalty and, after being sentenced to life imprisonment, was permitted to return to his native Tawara fief to serve out his term. But in November 1841, feeling he had brought disgrace on his family and his *han*, he took his own life.³⁰ Choei, after a perfunctory trial, was also given a life term. Although he escaped from prison in a fire in 1844 and tried to eke out a living at Uwajima under the assumed name of Sawa Sampaku, finally in 1850, he was discovered at Aoyama in Edo by officers at the Bakufu, and he too committed suicide.

This affair placed the Dutch scholars under much closer surveillance, and many of their voices were stifled. Yet Choei even in prison was anxious over the future of the country and while incarcerated wrote a pamphlet called *Tori no nakune* (The cry of a bird) in which he refuted charges of conspiracy:

It is 2,300 years since the opening of the country; Confucianism and Buddhism have circulated for 1600 or 1700 years; there is no one who does not respect these two teachings; Confucius was a native of China, and Buddhist priests imitate Indians; yet I never heard of one person going to a foreign country and rebelling against the empire. It is not 200 years since the spread of Dutch learning; the number of persons engaged in this study does not exceed one or two in 10,000,000; many despise it; few respect and believe in it; those who pursue this study have truth and reason in what they say, and it is advantageous as a study; [but] who would discard the happy land of the gods and fall in love with the cold and barren West and follow the Western savages; however, those who hate foreign learning frequently use this as a pretext in slandering it; . . . as far as all those who study foreign learning are concerned, it is unavoidable that their crime is light, and their punishment is heavy.³¹

The *Bansha no goku* bears certain important similarities to the von Siebold affair of a decade earlier. In both cases personal grievances and animosities precipitated official action. In both cases questions of violations of government regulations were involved. In both cases

foreigners, von Siebold directly and Morrison indirectly, were the cause of intra-Japanese divisions. In both cases Japanese scholars of Western learning seemed to be exceeding officially delimited purviews. In both cases the repressive actions of the Bakufu resulted in the suicides of leading scholars, Takahashi Kageyasu in the von Siebold affair and Ozeki San'ei, Takano Choei and Watanabe Kazan in the *Bansha no goku*. However, one interesting dissimilarity is that in the von Siebold affair while certain *Rangakusha* did try vigorously to disassociate themselves from their accused fellows, in the *Bansha no goku* matter persons directly involved with *Rangaku* seemed to have assented to the shogunate's rigorous response to *Yume monogatari* and *Shinkiron*.

For example, after Kazan and Choei had been arrested, the *ten-monkata* Shibukawa Rokuzo (Norinao) (1815–51), son of Shibukawa Kagesuke and a brilliant scholar learned in both Dutch and English,³² presented a memorial outlining his views on Dutch studies to the *roju* Mizuno Echizen no kami Tadakuni (1792–1851), the same official who had sanctioned the prosecution of Kazan and Choei. Since this document contains material pertinent to the official attitudes of the times, it is here presented in outline.³³ Rokuzo began by describing the relations between the Dutch scholars and the Bakufu. From the time of the eighth shogun, he wrote, the study of astronomy, geography, medical sciences, etc., had progressed and had become valuable to Japan. However, he continued, more recently those who engaged in Dutch learning had only studied it in order to enhance their reputations and had ignored the practical application of their endeavours. They had parroted strange tales which confused the public, and this was greatly different from the serious considerations of Yoshimune. Therefore, said Rokuzo, measures must be taken again this, and various things must be done.

He affirmed that the reports brought by the Dutch each year in order to inform the Japanese of the news of foreign countries were necessary. However, in the past when the Nagasaki interpreters translated these, if there were items which they believed would bring displeasure to the authorities, they omitted them from their reports but let them leak out freely to the public. This evil practice should cease, Rokuzo continued, and from now on things which referred to the reputation of Japan or to news of foreign states should be sealed by the Dutch and handed to the Nagasaki *bugyo* who should present this directly to the government at Edo where the translation should be

done. If this were done, Rokuzo believed that there would be no more leaks of secret information as in the *Morrison* case.

Further, he urged that the Dutch should only import into Japan books which were turned over to the Bakufu, i.e. there should be no private dealings in books. Also, since certain feudal retainers were studying *Rangaku* and learning such skills as gunnery and military science, and since this weakened the Bakufu, henceforward only books on medicine should be permitted to circulate. Previously when some non-medical scholars were learning about foreign conditions, and it was feared that they might start to question the Bakufu, due to the potentially 'unjust' nature of their criticism, the government carried out the Kansei ban on unorthodox studies. Thus, according to Rokuzo, closer supervision of Western learning should not be difficult to conduct.

The translation of books pertaining to medicine, astronomy and mathematics might be allowed, he said, but these must not be spread among the public. Since there was a particular need for Dutch textiles, goods, maps, etc., they might be brought into Japan, but the import of rare items which were not needed and of publications with pictures of landscapes and people should be prohibited. These latter, stated Rokuzo, only caused fads among the general public, and even people who could not understand Dutch studies developed various new ideas in accord with the stories heard from the *Rangakusha*, constructed odd things, carved out landscapes and people, drew Dutch letters on signboards, and inscribed Dutch letters on clothing and furnishings. Even worthless physicians put Dutch writing on their medical bags. In Rokuzo's view, even though individually these seemed small matters, when added together, they harmed the national structure and thus should be strictly controlled.

Though there was a theory that Dutch learning should be completely prohibited, this was not correct, Rokuzo said. Even if *Rangaku* were banned, since it was a study of long standing, it could hardly be stopped. If it were outlawed, study in secret would emerge. If it were permitted openly, as it then was, its evils could be easily detected; if it spread secretly, its evils would be surreptitiously diffused. Like the necessity for a stool pigeon in catching a thief, the Dutch scholars were necessary for knowing the intentions of the foreigners, he concluded.

This memorial of Shibukawa Rokuzo provides a very clear delineation of his reasoning, and something of the intellectual atmosphere of

the times was certainly reflected in his views. In May 1840, probably on the basis of Rokuzo's memorial, the Bakufu sought to control the spread to the public at large of books on the calendar and astronomy as well as of translated Dutch books generally, and in 1842 it was ordered that no translated Dutch books be published without the permission of the *machibugyo* (town magistrates). Curiously, therefore, Rokuzo himself who had started studying Dutch as early as 1808 in his capacity as a *tenmonkata* may have been responsible for greater official limitations on *Rangaku*.

Nevertheless, it is possible to analyse Rokuzo's memorial from three different perspectives. In the first place, it can be suggested that Rokuzo might have been seeking to secure and advance his own position within the official bureaucratic hierarchy at the expense of the steadily increasing number of Dutch scholars outside of government. Second, Rokuzo might have written his memorial for his own safety in the light of the effects of the von Siebold affair and of the *Bansha no goku*. Third, and most significant from the standpoint of Dutch studies as an intellectual movement in Tokugawa Japan, Rokuzo may well have been writing as a loyal functionary of the Bakufu whose work as a Dutch-style astronomer in no way diminished his commitment to his employers nor made any less deep his primary foundation in traditional Japanese thought, the essential Confucian basis of which remained 'unsullied' by Western technological influences.

Other scholars such as Aizawa Seishisai and Fujita Toko criticized the Dutch scholars for trying to bring about an 'awakening' of the public. Their two major points of criticism were that the *Rangakusha* were too eager to tell of the strength and wealth of the West and that the result was to frighten the populace, and that the Dutch scholars were too infatuated with Western civilization, thus worshipping it and despising their own. In reality, the facts about the national wealth and military power of the various countries of Europe and America not only became clear through Dutch learning but became known to the Japanese through books imported from China, the reports of the Dutch, the stories of the Dutch interpreters and the tales of returned castaways. Nevertheless, though Seishisai, Toko and their followers recognized the power of the West, they made use of this knowledge to try to stimulate a spirit of patriotic pride and tended to play down the patent inequalities between Japan and the foreign powers. In contrast, some Dutch scholars tried to indicate the difficult road which

the Japanese would have to travel in order to acquire the techniques of an advanced civilization which could then enable Japan to meet the foreigners on a more equal footing.

Such views were often expressed by means of a laudatory reference to some facets of European progress. For example, Honda Toshiaki said:

Since all of Europe has a system of putting the national interest foremost by developing enterprises, their first undertaking is to have their men sail the seas; . . . they educate and train and change the way of life of those people who have not yet been opened to civilization; they colonize those countries with small populations; they carry out everything in detail considering their profits for the distant future. Thus gradually their countries become wealthy.³⁴

And further:

Generation after generation there are learned men in Europe who make curious implements and rare goods. The methods of astronomy, geography, and navigation started in the West and went out all over the world. . . . Their number one advantage is their shipping for overseas navigation. Indeed it can be said that they are the mother countries of the world.³⁵

And he also discussed the vigour and strength of their national power:

Europe can be called without equal in the world.³⁶

It must be obvious that such views were set forth neither to frighten the Japanese public nor to belittle the Japanese homeland but rather in the hope of encouraging national development with the West as the example to emulate. Such scholars as Honda Toshiaki recognized the military weaknesses of Japan after nearly two centuries of peace and without modern weapons and without a navy. Watanabe Kazan pointed out the ease with which Japan could be blockaded and the superiority of Western gunnery. Takano Choei recognized how many islands there were in the vicinity of Japan where foreign fleets could assemble for an attack.

All of these commentators of necessity compared the power of Japan and the West and stated that Japan could ill afford the enmity of Europe. Yet the failure of these Western scholars to promote vigorous military measures in order to deal with the foreign problem was based on a firm conviction derived from their studies that any violent action would only provoke a violent reaction, in which case Japan would be overwhelmed by the Occidental states. The *yogakusha* generally believed in a policy of diplomatic negotiation and intensive study and

adaptation in order to raise their country as quickly as possible on a par with the West.

Perhaps unwittingly some Dutch scholars did to some extent develop a tendency to admire an often idealized West, at times even excessively. However, the scholarship of the most 'pro-Western' *Rangakusha* never really questioned the necessity of retaining and protecting 'Eastern values'. The conflict between the most nationalistic proponents of the *joi* philosophy, on the one hand, and the most outspoken supporters of the acquisition of knowledge and technology from the West, on the other hand, was more apparent than real. Their seeming disagreements concerned degree and method, not substance. For both groups concurred in the necessity to preserve the Japanese tradition and character intact. Both saw the foreigners as predatory and degenerate. Even the most rabid Mito loyalists were cognizant of the necessity of adopting some Western techniques. The essential difference, then, and not a very great one, between some of the Dutch scholars and some of their opponents was whether Japan ought to or, in fact, could 'expel the barbarians' at once or should over a brief period of years intensively foster Western-style technological development and then at the point where such development reached the level of the West 'expel the barbarians'.

A parallel dispute developed in the final decades of the Tokugawa era prior to the arrival of Perry's 'black ships'. This was the problem of whether or not the *sakoku* policy itself was still viable in the face of the increasing frequency of the appearance on the coasts of Japan of Russian, British and American ships. Those writers who began to speculate about the possibility of opening the country in some way to foreign contacts, the so-called 'open country' theorizers (*kaikokuronsha*), were to a large extent to be found among the Dutch scholars.

Accordingly, official suspicion was directed at those who were conversant with things Dutch, especially if they were outside the purview of the shogunal bureaucracy, as witness the fates of Ozeki San'ei, Watanabe Kazan and Takano Choei. Nevertheless, as a result of their knowledge of the West and its advanced techniques, certain *yogakusha* realized the weakness of Japan's military defences and suggested that an opening of the country voluntarily on Japan's terms would be preferable to the anticipated humiliation of a forceful opening that could not be resisted. Such proponents of an 'open country' (*kaikoku*) were anathema to the Bakufu, despite the apparent foresightedness on which their views seem to have been founded.

The policy-makers who adhered to *sakoku* remained bound by their Confucian outlook. They maintained that isolation had been decreed by a previous shogun and that any change in a traditional, 200-year regulation would be an insult to his memory; they argued that the Occidentals who came by sea seeking trade were evil merchants who did not know righteousness and morality and sought only profit; they scoffed at tales of Western military power; they said that any really vital scientific information could be obtained from the Dutch, as in the past. However, some *Rangakusha* who supported *kaikoku* based their ideas on a reasonably accurate appraisal of information on foreign conditions. They understood that if Japan did not open its doors of its own volition, it might be forced to do so under circumstances which no one could then predict. Moreover, although they were often charged with treasonous intentions by their critics, their rationale for an open country was no less patriotic than that of those who proclaimed the immutability of *sakoku*.

Interestingly one of the first *Rangakusha* to take a position on *sakoku* was Shizuki Tadao who selected a section of Engelbert Kaempfer's *History of Japan* to translate into Japanese. This was the portion of volume 3 (pp. 301–36) entitled 'An Enquiry, whether it be conducive for the good of the Japanese Empire to keep it shut up as it now is, and not to suffer its inhabitants to have any Commerce, with foreign nations, either at home or abroad', which was called in Japanese *Sakokuron* (Essay on the closed country) (1802). The purpose of Tadao's work was apparently to show that the leading European authority on Japan believed it best for the Bakufu to continue its policy of isolation. This is curious in that it is probably the only instance during the Tokugawa Period of a Western source being employed to bolster Japanese official policy. Perhaps Tadao felt that the country should remain closed so that it could take in only those ideas which the Bakufu might deem 'safe'. In offering his *Sakokuron* it is also possible that this may have been a defence mechanism to offset his own somewhat revolutionary thinking as expressed in his other writings and to show that his work was in line with the official position that Western technology had legitimacy in Japan only in so far as it was utilized within the confines of the harmonious, immutable Confucian societal order.

With the advent of increased contact with the Russians at the turn of the nineteenth century, those favouring the opening of the country came into greater prominence. Kudo Heisuke (1739–1800) was the

man who perhaps originated a school of thought which was called the *Kaikoku shiso* (Open country ideology). Heisuke was the son of a Kishu physician and had been adopted as a child by Kudo Joan (d. 1755), fief physician at Sendai. At an early age Heisuke went to Edo where he studied Dutch learning with such men as Aoki Konyo, Nakagawa Jun'an and Noro Genjo. Later (1780) he journeyed to Nagasaki where he became friendly with the Hollanders, and he made a study of world conditions. In 1783, he wrote *Akaezo fusetsuko* (Treatise on rumours about the red barbarians). In the preface Heisuke stated:

The real name for the country of the red barbarians is *Kamusasuka*. After careful study I have stated that east of Holland there is a country called Russia. Its capital is Moscow. . . . This country grew powerful in the Kanbun Period [1661–72]. And in the Shotoku Period [1711–15] it conquered a barbarous country, Kamchatka. What we call Akaezo is called in Russia Kamchatka. Between Kamchatka and Ezo are islands. Chishima = Kurile Islands. Since the Kyoho Period [1716–35] the Russians made invasions there and built fortresses. I hear that sometimes Russian exiles come in the neighborhood of the provinces of Matsumae.^[37] Russia borders on Holland. From here to Akaezo is a distance of 5000 *ri*. I saw a resemblance between the history of the people of Matsumae and that in the Dutch book, and that interested me very much. I combined my own views on this matter with those of my study and wrote this book in two volumes. . . .³⁸

In volume 2 Heisuke wrote about Kamchatka and described Russian descents in the north. Volume 1, however, contains the author's purpose in composing this work, namely that Russia, while gradually expanding its territory and nursing shipwrecked Japanese, was studying Japan even to the extent of learning the Japanese language. The Russians, Heisuke wrote, were also journeying about in the northern seas and were ascertaining the topography of Japan. Therefore, Heisuke said, Japan must prepare. First, Japan must strengthen its fortifications. Then all smuggling must be stopped. And when smuggling has been ended, trade with Russia must be opened up on a legitimate basis, so that by becoming fully acquainted with the characteristics and customs of that country, Japan can take appropriate measures. Next, the mineral wealth of Hokkaido should be surveyed; if anything worthwhile is discovered, it should be mined and traded with the Russians, and the profits should be used for the development of Hokkaido. Heisuke added that trade need not be limited to Hokkaido but that Nagasaki and any other fortified port might be opened for commerce. In Heisuke's view, if this were not

done, the people of Kamchatka would unite with the people of Hokkaido and would come under Russian domination and be permanently lost to Japan.

Heisuke cleverly, from the standpoint of his own self-preservation, only permitted this work to circulate among powerful Bakufu officials whose help he sought to further his proposals. Through one of the treasury officials the book came into the hands of the *roju* Tanuma Okitsugu (1719–88), who was very favourably impressed. Tanuma immediately ordered the Matsumae domain to submit a complete report on the situation then prevailing in the Hokkaido area. Concealing its own lack of military preparedness and its own private trade with the Russian-held islands to the north the *han* answered in a vague manner. Tanuma was highly dissatisfied and in 1785 dispatched a Bakufu expedition to inspect the area from Karafuto to Chishima first hand. However, by the time of the return of the investigating party Tanuma was no longer in power, and his successor showed no interest in the information obtained.

The difficulties of Kudo Heisuke's contemporary Hayashi Shihei (1738–93) were indicative of the official response to even implied criticism of government policies. Hayashi was an inquisitive scholar from the north of Japan who was greatly interested in the various facets of European civilization. He made several trips to Nagasaki, the first in 1775, where he was exposed to many concepts which made him critical of Japan's intellectual isolation. In 1785, he published his first important book *Sangoku tsuran zusetsu* (Illustrated discussion of a complete view of three countries), a geography of Korea, the Ryukyu Islands, and Hokkaido with maps of Japan, Korea, Hokkaido, the Ryukyus and the Bonin Islands. In the preface he wrote:

Great is the necessity of studying geography. When the authorities do not know geography, they will fail in time of need. I wrote this book about Korea, Loocho, Ezo, and Bonin because these countries are situated in the neighborhood of Japan, and it is very important to learn their natural conditions. Besides it may be useful from the point of view of our defence.³⁹

But the work of Shihei which caused the most excitement was published the following year, 1786. This was *Kaikoku heidan* (Military tales of a sea-girt country) in which the first fifteen chapters were a treatise on military tactics on land and sea while the sixteenth chapter described the ingredients necessary to make a nation rich and strong. The epilogue admonished: 'These are the most important

indications for military leaders. Readers, read it attentively.'⁴⁰
Kaikoku heidan began:

What is meant by a maritime nation? It is a country not connected by land to any other, but which is bordered on all sides by the sea. There are defence preparations which are suited to a maritime nation, and which differ in kind from those prescribed in Chinese military works, as well as those which have traditionally been taught in Japan by the various schools. . . .

Military preparation for Japan means a knowledge of the way to repel foreign invaders, a vital consideration at present. The way to do this is by naval warfare; the essential factor in naval warfare is cannons. To be well prepared in these two respects is the true requisite of Japanese defence, unlike the military policies appropriate to such continental countries as China and Tartary. Only when naval warfare has been mastered should land warfare be considered.⁴¹

Surprisingly in Japan, a country surrounded by water, at the time of Shihei there was not only no navy but as a result of the *sakoku* edict not even any single ship large enough for overseas voyages. Military tactics in those days were completely restricted to ground warfare and generally followed the precepts set down in ancient and revered Chinese texts. Since the main military problem in China from ancient times had been overland invasion, there seemed to be no Chinese treatise to use as a precedent for the conduct of naval warfare. Thus, Hayashi Shihei's writings were in part directed at Confucianists and their beloved China and in part a clarion call for Japan to build up its defences. Shihei's view of China was typified by his description of the Chinese as potential enemies corrupted by their Manchu rulers.

However, he believed Russia to be an even greater threat to Japan. This was based not only on the increased activity of the Russians in the area of the Kurile Islands but also on the high regard in which Shihei held European military techniques such as the employment of great firepower and of large navies. These military virtues, he believed, were supported by what he idealized as the benevolent and well-organized governments of the West and by their 'noble tradition' of scientific learning. Shihei warned that although European nations might be too far removed from Japan to launch an all-out invasion, nevertheless there was always the possibility that the Chinese might copy the tactics of the Occidental powers and send an expeditionary force to the shores of Japan. To remedy these hypothetical dangers, Shihei called for the fortifications of the coastline with naval batteries and a broad programme of re-education for the samurai in both military and literary subjects in order to cure the warrior class of its

indolence induced by the long years of peace and perhaps to produce from its midst leaders of the calibre of his idol, Empress Catherine of Russia.

When the entire *Kaikoku heidan* was printed in 1791, Hayashi Shihei made the mistake which Kudo Heisuke had carefully avoided. Shihei not only showed his book to the Bakufu officials, but he simultaneously published it and allegedly shocked the Japanese public. As a result, he was denounced as a subversive and was taken into custody and sent to Edo where he was imprisoned on orders from the chief administrator of the shogunate Matsudaira Sadanobu (1758–1829). That Shihei had foreseen his fate may be gathered from the following in the preface of *Kaikoku heidan*:

I am the first person to have discussed this matter which has excited my deep concern. My extensive investigations into the subject have yielded the information incorporated in this book. But I know that no ordinary citizen is permitted to disclose such facts even if he possesses them; this silence is taken as a mark of circumspection. As I am a single man who likes to act when he is convinced of something, I have not given a second thought to the possibility of incurring the displeasure of the authorities. . . . My purpose in compiling this book has been to inform the people what is the essential defence for a maritime nation. This is why I have undertaken so grave a problem in spite of the humbleness of my position and the smallness of my virtue. I realize that I have gone far beyond my station and that I shall not escape punishment. But it is his words and not the author which matter.⁴²

Shihei's arrest was ordered by Sadanobu on grounds that he had published a work which infringed on the province of the authorities and which advocated a change in existing traditions. The shogunate determined that to execute Shihei was unnecessary. The printing blocks of *Kaikoku heidan* were destroyed, and Shihei was returned to Sendai and was confined to his brother's house where it was said that he died of depression in 1793.

Actually, Matsudaira Sadanobu was not necessarily opposed to Shihei's proposals per se, for he himself had ordered an improvement to be made in coastal defences. What Sadanobu could not accept was Shihei's brash method of appealing to the public for support for his ideas. This was considered a treasonous act and had to be punished by appropriate means. Sadanobu's purposes were to prevent other scholars so far as possible from giving public vent to their opinions and to uphold the policy of bringing under the direct control of the Bakufu all those engaged in Western studies. By this method he hoped to keep the country calm and to suppress any actions which

might even theoretically pose potential threats to Tokugawa rule.

In 1807, in *Yaso dokugo* (Monologue of an old man in the country) Sugita Gempaku wrote as follows:

At present our country is plagued by a great disease. This is the recent incursion of the Russians. And this is because our treatment of them is not proper. As a policy on this question we have a choice of two: either peaceful relations or a state of perpetual warfare. On considering the conditions of our warriors, they have grown up in extreme luxury for the last two hundred years and for five or six generations have not known the word 'fight'; the 'way of the warrior' has been drastically weakened, and, if there were a sudden occurrence, seven or eight out of ten *hatamoto* or *gokenin*^[43] who would rise to the emergency would have the appearance of women, and their servile intentions would be like [those of] merchants; the spirit of purity and of the warrior seems to have gone. With such weak troops what would happen on meeting strong forces in battle? In particular if a [foreign] navy were to land and there were severe fighting, people who do not know and understand these things would probably boast that that navy could not measure up to our troops. If these were the warrior-spirited soldiers of about 1600, this would probably be so; but now in a world of extreme weakness only occasionally does one hear a smattering of tales of olden days, and perhaps they are not reliable. It is like an old man who weak in body still chatters well and forgetting his immobility and ignoring the weakness of his bones and veins boasts of his health. This too is the beginning of disaster, and it is important to plan well the consideration of all factors. We must unite in peaceful relations and carry out foreign trade and meanwhile must revive the military spirit while seeking a means of strengthening our country's foundation.⁴⁴

This, however, was not an opinion supporting directly opening the country and importing foreign culture, but from the military standpoint Gempaku's conclusions were unavoidable. Gempaku also proposed that after cementing peaceful relations with foreign countries there could be plans for future action. The implicit suggestion again was, paralleling the views of the *joi* proponents, that once the country was opened and the weapons and military science of the West were imported, finally the foreigners could be driven out. Nevertheless, it seems clear from reference to Gempaku's overall thinking that this latter idea may have been inserted in this essay for his own self-defence in order to disguise his apparent belief in opening the country as opposed to the isolation policy of the Bakufu.⁴⁵ That this probably was the case appears more evident in the next section of *Yaso dokugo* when, after describing the complete futility of making enemies of the Western powers, he said: 'Be that as it may, for the present I believe trade should be permitted; and, if this is conducted for the good of the

whole nation and with utter sincerity, I believe all countries will welcome it.⁴⁶

For the views of Shiba Kokan on opening the country, reference must be made to his *Shunparo hikki* (Jottings of Shunparo) (1811). First, from the economic point of view, he saw the necessity for the commencement of trade. Kokan advocated commercial dealings with Russia, in particular, in order to maintain the price of rice, saying: 'At present rice is cheap, and militarism is not flourishing; is it not foolish to think of not trading with Russia?'⁴⁷ Second, from the point of view of Japan's population problem, he was a proponent of relations with foreign countries so that there might be freedom of migration for the overpopulation. Third, Kokan counselled mildness in the treatment of foreign envoys. Grieved and indignant at the conduct of the Bakufu towards the Russian ambassador Rezanov in 1804, Kokan wrote:

The Russian envoy in half a year at Nagasaki was not permitted to land, and besides that the replies of the Bakufu were impolite and arrogant. . . . Rezanov is the envoy of the emperor of that country. Their emperor is the equivalent of our emperor. Etiquette is the first sign of humanity and education. If one may speak figuratively, it is like acting towards people who dress properly as though they were naked. They will probably think of the Japanese as beasts.⁴⁸

He seems to have recognized the urgency of the problem of foreign relations and to have perceived that the end of isolation was no longer something to be considered fancifully but was a serious political problem.

Koga Toan (1788–1847), a Chinese scholar who took an interest in learning and whose ideal ruler was Peter the Great (1682–1725) of Russia, wrote *Gikyokuron jihoji* (Radical arguments on current affairs) in which he advocated peaceful and friendly relations with foreign powers and said that it was stupid to have refused to trade with Rezanov. However, like many of his contemporary *kaikokuronsha*, he stated that any amicable contacts would be for the purpose of building up military strength. In another book *Kaibo okusoku* (Speculation on maritime defence) (1838) he counselled that the country should be opened in order to build up the navy.

Toan argued that Japan, which stands isolated in the vast seas, required warships and guns; and, though large men-of-war and sea battles are the strong points of people of the sea, Japan also needs an army. It has been said, Toan recalled, that since Japan cannot repel an enemy on the sea, anyone taking advantage of a landing on the coast

would be slaughtered. This is a theory which has been believed for 200 years, but, asked Toan, how could this be put into practice today, in view of the decay of the martial spirit which has for so long lain dormant? Toan continued saying that among the various weapons guns are indeed number one for controlling an enemy; but, considering the degradation of the samurai and the lack of skill of the foot soldiers, he lamented the fact that the study of gunnery was practically non-existent. Next, he recommended that once Japan was equipped with warships and guns, it should return to the old system of pre-isolation and should send ships to places like India, Siam and Annam in order to carry on trade and make the country prosperous. Toan wrote further that although opening the country now and closing it in the past did not have the same form, the two policies were in complete harmony since they both had the common objective of protecting the nation. It was foolish, he said, to adhere obstinately to isolation. It was, of course, regrettable, Toan noted, that in the past foreigners took advantage of the penetration of Japan by Christianity, but now European powers swallow up various countries with armies and not with doctrines. Confusing one's enemy by doctrinal methods was only applicable in former times. Thus, outmoded isolation, he contended, should be done away with. In conclusion Toan added that in view of the treatment accorded Japanese castaways by the Russians the expulsion of the occasional foreigners who reached the shores of Japan could not be considered a wise policy.⁴⁹

There were also those who advocated the opening of the country primarily from an economic standpoint. In *Hokuchi kigen* (Defence policy for the northern area) (1797), Ohara Sakingo (d. 1810) proposed making all trade legal and thus stamping out smuggling. In 1791, Honda Toshiaki had written a book called *Ezo tochi kaihatsu guzon no taigai* (An outline of my humble belief in the opening and development of land in Hokkaido) which was also called *Sekii dosei* (Movements of the red savages) and which examined Russia's penetration in the north and discussed the emergency need for the development of Hokkaido and Karafuto. He even proposed moving the capital of Japan to Kamchatka. Toshiaki's ideas were, of course, stimulated by the pressure of foreign affairs. He said that this was an emergency in view of the activities of the Russians, and he also recommended it as an answer to the population problem. Since Toshiaki believed that none of this could be done without knowledge of astronomy, geography and navigation, he argued that

Japan must prepare itself by engaging in overseas trade.

Toshiaki noted that in Europe in order to nurture their industries, the great nations had gathered natural products of the highest value from all the countries of the world. He explained that it had been possible for the Westerners to make their nations strong and prosperous by sending out ships to foreign countries, by trading and by bringing back foreign products to their own lands. By recording these reasons for European prosperity, he intimated that Japan might achieve similar results by employing the same methods.

Again in 1798, in *Seiki monogatari*, Toshiaki discussed the need for the resumption of foreign trade in order to increase Japan's food supply. The essence of this book is its emphasis on what Toshiaki termed the four great emergencies: gunpowder, various metals, shipping and colonization. He stressed the peacetime uses of gunpowder for preparing rivers and harbours and in construction and engineering projects; gold and silver should not be exported but should be mined in order to back the currency, while copper, iron and lead could all be used for permanent structures; ships must be built by the government for internal and external trade; finally, with this means of transport, the islands around Japan could be colonized and developed, and their products could be used to make Japan prosperous.

Sato Nobuhiro (see chapter X above) in his *Keizai yoroku* (Principles of economics) wrote in the preface as follows:

My relatives occupied themselves in Dewa with medical practice. A big famine occurred more than once in my grandfather's time in his youth. He decided to assuage this great calamity by studying economy. In order to study measures for the development of agriculture he travelled through the country for forty years. He died in 1735. My father followed this example and was a zealous scholar in this branch of study. In 1784 he went to Ezo and took me with him. He investigated the natural condition of Ezo, and later we travelled through Nambu and Sendai. In 1784 he went to the copper mines of Ashio where he died of a sunstroke. He left the following commission: 'If you, after my death, should return to your native place, you would die like a plant and with you the principles at which your ancestors have worked. Though you are young, there is much in you. Go immediately to Edo and with a talented scholar study economy and the measures to be taken for industry'. . . . I began by following the first advice given me and went to Edo to Udagawa's school where I learned natural history and the Dutch language; besides geography, chronology, mathematics, and surveying. I did so for several years before travelling.⁵⁰

Nobuhiro travelled widely in Japan studying geography and topo-

graphy and the development of natural resources in agriculture, mining and industry, and he wrote several books setting forth his views on a wide range of topics. In *Rangaku daidohen* (The principle of Dutch learning) he demonstrated his knowledge of Dutch studies. In a two-volume work *Seiyo rekkoku shiryaku* (Short history of the Western powers) (1808) Nobuhiro also contributed one of the first histories of the West in the Japanese language.

Suito hiroku (Secret record of imperial succession) described Nobuhiro's ideas about government and foreign relations. He proposed the abolition of the feudal system and the division of all citizens into eight classes according to occupation; under three levels of officialdom – political, religious and educational – he conceived of six departments: army, navy, circulation (commerce, currency), construction, natural products (ores, lumber, fish) and food. In education in addition to the primary school, Nobuhiro envisaged the modern kindergarten and special schools for the poor. His concept of a sort of modified national socialism extended to government-operated banks and pawnshops. With Edo and Osaka as Eastern and Western capitals, Nobuhiro proposed dividing the country into fourteen provinces to be governed by regional commanders with both civil and military functions. Finally, Nobuhiro proposed a course of overseas expansion: (1) seize the Philippines; (2) open the Ogasawara Islands; (3) send the soldiers of Aomori and Sendai to the Amur River, land troops in Manchuria and Korea, and land men from Matsue, Hagi and Hakata in Korea; (4) having captured Korea and Manchuria, head for Peking, and follow up with the storming of the Ryukyus and Formosa; (5) penetrate Chekiang⁵¹ (6) when the soldiers of Kumamoto enter Nanking guarding the emperor, and when 'benevolent' government is carried out, Japanese and Chinese troops together can overwhelm Europe and America.⁵²

In 1807, Nobuhiro's *Kaibosaku* (Policy for maritime defence) appeared in support of foreign trade and in opposition to isolation. His argument was that without trade Japan could not obtain the goods it needed and that as its population increased domestic production did not keep pace. According to Nobuhiro, people living in a dream of peace without foreign relations will not know what to do when one day an explosion occurs. Since maritime trade is the basis of a strong military, by going out on the seas every day and enduring the dangers of storms, head-winds and pirates, the Japanese people will become heroic and daring.

Towards Russia his policy was first to occupy Kamchatka and seize the Sea of Okhotsk, then to imprison the Russian guards, and finally to construct fortifications and make it Japanese territory. Towards England his policy was as follows: (1) send ships to the Izu Islands and take the Bonins; (2) send immigrants to these areas and develop agriculture; (3) send ships from there to occupy the Philippines; (4) seize various other islands such as Java and Borneo and tie them closely to Japan; (5) use the profits of commerce to build up Japan's merchant marine; (6) place military garrisons in various fortified places so that when Japan's military might is thus broadened, no matter how violent the British are, Japan shall control the Far East.⁵³

In their writings Takano Choei and Watanabe Kazan discussed the impossibility of Japan's repelling an armed attack and driving away the Western powers with non-existent force. Choei and Kazan demonstrated that they fully realized that the problem of foreign states knocking at the doors of Japan would become more and more pressing. However, even they did not directly advocate opening the country. In fact, it is difficult to say that there was any generic position among Dutch scholars on the *kaikoku* question.

There is more than sufficient evidence to indicate that the views of the *Rangakusha* on this question, as on many others of a political caste, were neither clearly formulated nor directly articulated. One reason was that there was, in the end, no easily definable *Rangaku* 'philosophy' which emerged and, at least theoretically, might have contributed to a generally accepted point of view among the Dutch scholars on a question of as much import as that of whether or not to end Japan's self-imposed isolation. Moreover, lacking any uniform foundation on which to build their knowledge of the West except, of course, their shared commitment to Confucianism, it is not surprising that there was no particular base of support for the *kaikoku* position. In addition, the overweening role of the government in all phases of Tokugawa life including intellectual activity obviously made it much more difficult for anyone to take a position outspokenly in opposition to that of the Bakufu.

On the contrary, apparent advocates of *sakoku* among the *Rangakusha* included such prominent figures as Sugita Gempaku, Shizuki Tadao, Aoki Okikatsu, Takahashi Kageyasu and Shibukawa Rokuzo. Despite shogunal fears, *kaikokuronsha* were really very few in number and, even then, in only exceptional cases directly proposed an end to seclusion. As Japan's international position became more tenuous

with the southward advance of Russia and the incursions of England by sea, certain views did come to the fore (and not only among Dutch scholars) which suggested possible changes in traditional policies but *only*, in the eyes of their proponents, to strengthen the *Bakuhantaisei* and make it more impregnable to foreign penetration.

To this end, as has been described in the foregoing, various schemes were put forward for Japan to develop a navy and/or a merchant marine, to colonize and to develop economically and strategically such immediately surrounding islands as Hokkaido, the Kuriles, the Ogasawara, the Bonins or the Ryukyus, or even to pursue such policies to the Philippines or Taiwan and even China itself, to encourage foreign trade and overseas settlement and, most importantly, to strengthen the country militarily by means of coastal defence with new weapons, new fortifications and new kinds of military organization. Though the shogunal authorities in their congenital unease about possible conspiracies usually saw such ideas as critical of and dangerous to the equilibrium of Bakufu control of Japan, supporters of these ideas were only in the rarest instances seriously suggesting radical changes in the existing governmental structure generally or in the *sakoku* policy specifically.

XV

Conclusion

At its inception the Tokugawa regime was in many ways a miracle of political craftsmanship. No aspects of Japanese political, social, economic or intellectual life were left unregulated in the attempt to create stable and durable institutions. Controlled and limited foreign contacts were further indications of the desire of the government to minimize disturbing influences from within or without. Moreover, the Bakufu attempted to maintain self-sufficiency not only in the realm of politics and economics but in the world of the intellect as well. By means of a combination of the Chu Hsi brand of Neo-Confucianism for the elite and of popular Buddhism for the masses, the Tokugawa leaders sought to devise a system which would satisfy the country both philosophically and spiritually.

However, over time such diverse factors as the weakening of samurai control of Japanese society, the gradual shift in the economic base towards the cities, the emergence of the vitality of the *chonin* despite the lowly rung on the ladder of Tokugawa society officially assigned to them, and the increasing stultification of the Bakufu-nurtured Neo-Confucian ethos combined to stimulate a variety of new intellectual manifestations. Among these was, of course, *Rangaku*.

As has been detailed in the preceding chapters, during the years from 1640 to 1853 the Tokugawa regime permitted only a very restricted contact with one European power – Holland. Yet from this single minute source and the relatively small number of men who were attracted to the knowledge which emanated from it was derived the substantial body of information which this volume has attempted to describe. The acquisition of this knowledge was promoted principally by a group of Japanese scholars who interested themselves almost exclusively in certain Western scientific techniques. Although the political power of this group was non-existent, and although they were subject to the often oppressive atmosphere of feudalism and isolation, their achievements, within prescribed limits, gained sufficient prominence and respect to be given the generic appellation ‘Dutch studies’ (*Rangaku*).

In an analysis of *Rangaku*, as in any investigation of intellectual history, the two principal problems whose solutions remain obscure are what, in fact, was going on inside the heads of those who could in some way be categorized as *Rangakusha* and what was the actual effect of the research, writing and teaching which they carried out. In the former instance perhaps the best one can do is to itemize their respective familial, educational and occupational environments and to try to infer from those as well as from the products of their study of the West what their 'mind set' might have been. The question of effect is still more complex since one must deal with both 'positive' and 'negative' factors. This means, for example, on the one hand, an accounting of the numbers of written works dealing with knowledge obtained from or through the Dutch or of the numbers of disciples and students of *Rangakusha* teacher-scholars or of *han* or private schools where Dutch studies were part of the curriculum.¹ It also means, on the other hand, taking careful note of the extent and nature of the opposition which the Dutch scholars aroused in the writings of an Entsu or an Ohashi Totsuan or as in the response of the Bakufu to the von Siebold affair or to the *Bansha no goku*.

In the history of *Rangaku* there are a number of unusual aspects which make it quite difficult to develop any overall estimation of its significance. One particularly striking facet of the entire *Rangaku* experience was the apparent inability of the Dutch scholars in Japan to grasp the significance of chronology in Western culture. The evidence points to an apparent serious lack of intercultural communication in so far as chronology was concerned. It is practically impossible, for example, to discern any sense on the part of the Japanese that there had been a scientific revolution in the West, that this was a continuing revolution and that its pace was constantly increasing. The date of publication of a Western book or the sequence in which ideas evolved in the West seem not to have played any special part in the Japanese process of the acquisition of information from Europe through the Dutch. Moreover, the fact that the Japanese never knew such 'original classics' as the *Principia* of Newton or Vesalius's anatomy or the works of Boerhaave but were dependent on Dutch translations of Keill or Kulmus or on the commentaries of Van Swieten never seems to have been an issue among the *Rangakusha*. For in the light of their Confucian training and their reliance on the Confucian classics, the Dutch scholars somehow must have viewed 'Western knowledge' as a kind of Confucian-type immutable scholarly

whole, bits and pieces of which they were fitting together. Thus, to translate, retranslate and re-retranslate the work of Johnston or of Dodonaeus for some two centuries seemed quite appropriate; perhaps it gave such works a kind of 'classical' status of their own. Or to spend over thirty years painstakingly translating selected sections of an increasingly outdated revised edition of Chomel never daunted its translators who were the cream of the *Rangakusha*.

Perhaps the most impressive evidence of the seeming insensitivity of the *Rangakusha* to chronology and of the haphazard way in which knowledge from the West was 'integrated' into their intellectual purview is found in that most prominent sector of Dutch studies, namely medicine. At a very elementary level, failure to comprehend the role of chronology in Western medical science was demonstrated by the fact that during the Tokugawa Period Dutch-oriented physicians developed a kind of cult of Hippocrates with a great number of portraits of Hippocrates appearing in the possession of these same doctors. However, this was long after the 'Return to Hippocrates' movement in Europe was over. Moreover, there do not seem to have been in Japan any portraits of Aristotle, Galen, Avicenna or Averroes. In fact, the first published account of Aristotle appeared in *Richerand jinshin kyuri* (Richerand's study of human physiology), an 1855 translation by Hirose Genkyo² (1821–70) of the 1826 Dutch translation of *Nouveaux éléments de physiologie* by A. B. Richerand (1779–1840).

A more sophisticated example of apparent Japanese ignorance of the evolving history of Western medicine was the fact that the theory of the circulation of the blood propounded by William Harvey (1578–1657) was taken for granted by the Japanese Dutch-style medical practitioners, as though it had always been an essential element of Western medicine. Yet the experiment which Harvey found most important for his ideas, the possibility of reviving the heart at the moment of death by placing a warm finger wet with saliva on the right auricle, was completely unknown during the Tokugawa Period. Nor did any of the *Rangakusha* ever recognize the contradictions of *Kaitai shinsho* so far as Harvey's theory of blood circulation was concerned.

Again in the field of medicine, perhaps the most important instance of indifference to chronology is evident in the lack of any system or order to the way in which the Japanese approached the task of translating Dutch medical books. The translation of such books was embarked upon by the *Rangakusha* on the basis of two practical

considerations: first, of course, on the basis of what books from Holland actually were available when one wished to take up the arduous responsibility of translation; second, on the basis of the particular medical needs which existed and which, it was believed, if the Dutch books were accessible, could be met by their translation. In addition, inattention to chronology on the part of the Dutch scholars was undoubtedly fostered by their disinterest in Western medical theory. Books dealing with theory were generally passed over since they were the most difficult and time-consuming linguistically, since the concepts they contained were hardest to transpose into a viable Japanese context and since, in any event, Western medical techniques were simply being absorbed by what has been called the 'sponge-like character'³ of Japan's Neo-Confucian intellectual heritage.

Without comprehending the chronological evolution of Western medicine, of course, the Japanese also had no idea that the medical knowledge which the Dutch were transmitting to them was made up of two distinct kinds. On the one hand, there was the so-called bedside medicine which developed under the iatrophysical influence of René Descartes flavoured with Hippocratic natural philosophy. On the other hand, there was the German tradition of Hufeland based on the *a priori* philosophy of Goethe, Kant and Schelling. Nor did the Japanese appear to have any understanding of the dominant role which bedside medicine assumed in Europe in the first half of the eighteenth century under the leadership of the Leiden physician and teacher Hermann Boerhaave. Accordingly, what emerged in Japan was an amorphous melange of the Leiden School and its offspring the Old Vienna School of van Swieten, his pupils Stoerck and de Haen and their student von Plenck, of the Edinburgh School of Huxham and of the German School of Heister undifferentiatingly intermingled with Hufeland's 'vitalism' (*seikironigaku*).

The actual order in which the Leiden School and its offshoots were introduced into Japan was first von Plenck, then Heister and then Huxham. At last it was von Siebold who led the way to van Swieten as the student of and commentator on Boerhaave. Uno Ransai translated van Swieten's *Korte beschryving en geneeswys der ziekten, die veelzints in de krygsheirleegers voorkomen* in 1822 (first published in Dutch from the Latin in 1760) as *Seii chiyo* (Essentials of Western medical knowledge) (published 1825), and Tsuboi Shindo published his *Manbyo chijun* two years later, almost a century after van Swieten's Latin original. In fact, when Boerhaave's *Faser* theory made its appearance

in Japan through the works of van Swieten, this was the first time that the theory itself was specifically identified with and attributed to Boerhaave, although the *Faser* theory had been the basis of many Dutch medical books already translated into Japanese.⁴ Interestingly, too, once the source was known of so many of the Western medical concepts which had earlier reached Japan, no one explained that Boerhaave's philosophy of medicine was already out of date in Europe.

The theories of Hufeland became known through Ishikawa Genzui's manuscript translation *Genbyoron* (Essay on the origins of illness) (1812) which was based on the Dutch version of *Ideen über Pathologie*, first published in 1796. In this volume Hufeland discusses the neuropathology theory of the Edinburgh school's William Cullen (1712–90) as well as the opposing stimulus theory or Brunonian system⁵ of John Brown (1735–88) who had studied with Cullen but later broke with him. Still another translation of Hufeland was Sugita Seikei's *Saisei sampo* (1849) which is believed to be the first Japanese work to mention Kant and Schelling by name and to explain the *a priori* philosophical theory of medicine. However, much more significant to the Japanese Dutch-style physicians than the theories of Hufeland were his improved methods of judging arrhythmia, infarction of the heart and the state of pulsation.

Thus, what the Japanese came to know as the Leiden School dominated Western-influenced medical practice in Japan for a century, from about 1750 to about 1850, almost 100 years after it had been superseded in Europe itself. Further, in the first half of the nineteenth century when Hufeland's 'vitalistic' medicine was introduced into Japan, its theoretical departure from the thought of the Leiden School went relatively unnoticed by the *Rangakusha*. Accordingly, this account of the rather special way in which Western theories of medicine were introduced into Japan gives support to the view that the importance to Western thought of the concept of change over time was apparently beyond the ken of the Japanese during the Tokugawa Period.

What one misses, therefore, in the case of the Dutch scholars is any sense of the evolutionary character of Western science. Given the necessity for most of the specialists of *Rangaku* of puzzling out a Dutch text very slowly and very deliberately, often taking years in the process, there may have been some psychological parallel to the puzzling over a Confucian text which could also be a long drawn-out

matter. The latter had been around, in most cases, for millennia, and its validity had been enhanced correspondingly. There seemed to the Confucian-trained Japanese scholars no reason why the same should not be true of the former.

Indeed, the inability of the Japanese to grasp the concept of chronology in Western culture was only a part, if perhaps the easiest part to exemplify, of the real failure of the Japanese to understand Western values. Assuredly it is difficult for the contemporary observer to imagine the utter separation of technological information acquisition of the scope recounted in the previous chapters from the philosophical foundation from which that information was developed. But, in fact, this is exactly what the essence of *Rangaku* was – technology without ideology.

It was Hashimoto Sanai who wrote: ‘They have machines and technology; we have righteousness and filial piety.’⁶ Accordingly, throughout the Tokugawa era Western techniques were simply being grafted on to what was practically a universally accepted and seemingly a universally satisfying Neo-Confucian whole. This was the same Confucian philosophical credo which held at its core the view that heaven and man were in harmonious unity, that nature must be honoured as one would honour a friend and that man must be as one with nature. Western science, for its part, sought to conquer nature in any way appropriate to the betterment of mankind, and Western science aimed to achieve that conquest by experiment, analysis and deductive reasoning. The obvious conflict between these *Weltanschauungen* was simply evaded by the Japanese by means of their artificially constructed spirit–material dichotomy. However, in setting forth that division, the Japanese were at the same time delimiting their access to Western scientific philosophy and, therefore, were only able to utilize in a very confined sense a series of techniques which could somehow be made to adhere to the unquestioningly accepted Neo-Confucian theoretical framework of Tokugawa society.

Thus, for Japan perhaps the greatest deficiency of *Rangaku* was its valuelessness. It became a kind of miscellaneous collection of practical data and techniques without cohesive structure or inner meaning. Its limits were set early on and maintained, sometimes ruthlessly, by an overweening and often oppressive state system. And those limits were accepted willingly and, indeed, voluntarily reinforced by a scholarly community which was bound to an almost universally permeating Confucian ethos.

What may also appear to be a surprising characteristic of the development of Dutch studies is its relatively conformist contour. Both rigorous government supervision and intense government co-optation together with what was, in effect, self-supervision greatly diminished the potential for critical thinking in *Rangaku*. As has been suggested earlier, those who did make some rather critical jibes at certain elements of Tokugawa thought or society or who raised questions about such Bakufu policies as defence or *sakoku* were either considered to be so eccentric as to be ignored or were the victims of official punitive action. The mainstream scholars of things Dutch were principally government employees (interpreters, Banshowagegoyo, etc.) or independent translators or researchers acting in a purely technological context, and a goodly portion of these men held some kind of official appointment such as fief physician or physician attached to the shogunate itself. Overall, it must be concluded that *Rangaku* which, as the Bakufu quite understandably recognized, could well have nurtured criticism of the state structure utterly failed to do so.

There were, of course, several reasons for this. The continuous official pressures on all those associated with Dutch studies, pressures clearly intended to prevent any tendency toward non-conformism, have been more than sufficiently detailed in the preceding chapters. That there was no let-up in this policy is evident from the fact that as late as 1849 the Bakufu decreed that the study of European medicine with the sole exceptions of surgery and ophthalmology was henceforward forbidden and that no books dealing with the West could be published without the express consent of the authorities at Edo.⁷

Further, given the foundation of the traditional classical Chinese educational experience among the literate sector of Tokugawa society and given the official imprimatur which that educational pattern had, it is not far-fetched to presume that even those *Rangakusha* who made the most progress in learning the Dutch language and who developed a relatively sophisticated knowledge of the West were never truly at ease with Western learning. *Rangaku* remained a collectanea of skills seen, with very rare exceptions, as having certain utilitarian features which might be useful addenda to an otherwise well-ordered, harmonious society. What must be judged to be a general disinterest in the philosophy, religion, law, history and cultural tradition of Europe both on the part of the Tokugawa government and of the *Rangakusha* themselves reflects the view that for them the 'Wisdom of the East'

was fully sufficient unto itself. Thus, for the Dutch scholars of Japan it was curious, fascinating, even at times instructive to acquire the techniques of the West. But a country like Holland which did not know the Sage, whatever its technical competence, remained identified as 'barbarian' in the Chinese sense of the term, and therefore its humanistic heritage, if any, was not worthy of serious attention.

Still a further curb on the possibility of critical thought coming from the *Rangaku* coterie was the central role played by physicians. Here the leading interest of the Nagasaki interpreters and later of the Edo and then other Dutch scholars in acquiring medical techniques from the Hollanders provided a special impetus to the advancement of Western medical science in Japan. Doctors, usually having a substantial income, also had more free time to delve into Western learning. Important, too, was the patronage which physicians had from *han* officials and from the shogunate itself, a patronage which amounted to official protection and support.

As has been seen earlier in this volume, not only did medical doctors like Otsuki Gentaku and his disciples work assiduously for the Bakufu, but most of the examples of the development of Dutch studies in the various domains relied on the leadership of Dutch-style physicians. Moreover, in the Tokugawa social order to become a physician of any kind was a rather speedy way for an ambitious young man to earn money and to advance himself socially. This was made especially possible by the fact that there was no licensing system for doctors, and self-profession was the usual means of becoming a 'recognized' physician.

Thus, since any organized social group or any government places a high value on health and on prolonging life, physicians have traditionally held a privileged position. Japan was no exception to this phenomenon. And since Tokugawa officialdom recognized that these men of medicine rendered services which no one else could provide, the bureaucracy gave all of them, including the *Rangakusha*, a fair amount of leeway. For their part the physicians generally desired to protect their power base and to sustain their earning power and were highly unlikely to bite the hands that were feeding them. In essence those doctors who practised the so-called *Orandaryu* sought first of all to augment their incomes and second to become sufficiently reputable in their profession to secure eventually the patronage of those same authorities, either local or national or both, who were most fearful of 'subversive' activities among the Dutch scholars. So, it is not sur-

prising that no volcano of critical thought erupted in the ranks of physician-*Rangakusha*.

Whether an atmosphere of free inquiry engenders experimentation or whether an experimental tradition engenders critical thinking is perhaps difficult to say. At any rate, in the case of Tokugawa Japan neither was present. It is well understood that neither the special character of the Confucian intellectual tradition nor the strictures of the Bakufu generated an atmosphere of free inquiry. Likewise the formalistic nature of the Chinese ideological heritage belittled and depreciated experimentalism. Accordingly, despite the existence of *Rangaku*, such scientific attitudes as developed in the post-Renaissance West were unknown in Japan, and the kind of critical thinking that Western science, as a part of the Western heritage, stimulated had no counterpart in pre-Meiji Japan.

Still a different kind of phenomenon very profoundly affected what *Rangaku* became. This was that of the intermediary by which all information from Europe entered Japan, namely the Dutch themselves. That the Hollanders should, in effect, provide the Japanese for over two centuries with their 'window on the West' was a peculiar combination of historical accident and foresight. The historical accident was that the Dutch should have reached Japan exactly when they did and should have fortuitously appeared as an alternative for the Japanese to their already suspect Western trading partners Spain and Portugal. The foresight was partly on the Dutch side in that they recognized the possibility of securing a monopoly on Japan's trade with the West if they successfully intrigued against the Catholic Iberian states and if they fully complied with even the most extreme demands of the Bakufu. The Japanese, too, had foresight when, in a period of virulent anti-foreignism, they opted to permit the Dutch to remain as a trading partner although under very restricted circumstances. It must be noted, however, that neither the Japanese nor the Dutch ever viewed their bilateral relationship as anything more than a mutual economic convenience. That is, there was never intended by either side to be any cultural dimension to their intercourse.

Those minimal and often incidental cultural contacts that did develop prior to the time of Shogun Yoshimune were of an almost entirely voluntary nature. A curious, or perhaps a greedy, interpreter or two emerged from among the Japanese while the Dutch, again by happenstance, employed a Kaempfer. In fact, it was only in the nineteenth century that a recognizable coterie of *Rangakusha*

developed with their own specialities. The fingers of one hand suffice to count the Dutch or foreigners employed by the Dutch who contributed significantly to Japanese Dutch studies: Titsingh, Thunberg, Doeff, von Siebold. For, interestingly, while Yoshimune legitimized the study of Dutch science, it never seems to have occurred to him or his successors to have encouraged the Dutch to send to Japan individuals who might have provided valuable first-hand assistance in such basics as the study of the Dutch language or who might have explained the theories as well as the techniques contained in the Dutch books which the Japanese were so assiduously studying. There is surely no evidence that the Dutch, acting on their own, ever proposed any such thing either.

That there were such *opperhoofden* as Titsingh or Doeff who had some interest in the attempts of certain Japanese to learn the Dutch language was completely coincidental. As far as can be determined, the choice of personnel for the Dutch factory at Deshima never involved any scholarly prerequisites or entailed any concern for their ability to transmit Western values to the Japanese. Deshima was, from the Dutch point of view, throughout its history a trading post, and those Hollanders or foreigners who manned that remote commercial bastion were expected to perform accordingly. Even the role of the station doctor which has frequently been identified as significant for Dutch studies, with the single exception of von Siebold, was completely a chance one since the physician was assigned to Deshima as the caretaker of the Hollanders' health, not as a medical instructor for the Japanese. In short, there was only the most marginal and superficial interaction between the Dutchmen actually in Japan and Japanese Dutch studies. Inevitably this factor contributed to the intellectual isolation of *Rangaku* and to its unusually narrow confines.

A different facet of the role of the Dutch language as the medium through which the Japanese acquired their knowledge of the West was that of the particular kinds of books which were available to the *Rangakusha*. First of all, the Japanese were denied the greater scope of material which obviously would have been available in a major European language such as English, French or German. Second, it meant that, despite the often impressive achievements of seventeenth-century Dutch science, the advancement of the knowledge of Western technology in Japan would have been considerably greater had the European contact been with England, France or Germany. Third, since from the eighteenth century onwards Holland's own scientific

progress depended for the most part on the translation into Dutch of key works in almost every field, the books which the Japanese were getting were overwhelmingly translations which they, in turn, had had to translate. While the result of filtering information through two translations can only be guessed at, it is not extreme to suggest that this had an effect on the kind of materials with which the Japanese *Rangakusha* were working.⁸

After the arrival of Perry there was a dramatic shift away from the confines of *Rangaku*. Most significant at the outset was the recognition that the powers with which Japan was now confronted – the United States, Great Britain, Russia, Prussia, France – employed languages which were of far greater world import than that of Holland. Men who had given much of their mature lives to the study of ‘things Dutch’ were confronted with the fact that they would of necessity have to turn their talents elsewhere. Fukuzawa Yukichi undoubtedly expressed a typical reaction among such *Rangakusha* when on his first visit to Yokohama in 1859 he wrote:

I had been striving with all my powers for many years to learn the Dutch language. And now when I had reason to believe myself one of the best interpreters in the country, I found that I could not even read the signs of merchants who had come to trade with us from foreign lands.⁹

Shock seems to have followed shock. Not only was Dutch not a universal language, but European culture was not simply a miscellaneous collection of techniques and machines. There was not only a whole humanistic tradition to be unveiled perforce for Japanese eyes, but there was even another fully developed ethical and moral philosophy. The Confucian *Weltanschauung* of the Westerners as ‘barbarians’ evident even in the very nomenclature of the Bakufu’s Banshowagegoyo proved to have been meretricious and misleading. Immediately disappointing, too, was the fact that, with the exception of medicine to some extent, *Rangaku*, in the single area in which it appeared to be most advanced, in applied science, was incapable of providing an easy entrée into the full panoply of modern Western science.

Without a foundation in Western scientific theory the Dutch scholars’ assorted translations of a haphazardly chronological and topical potpourri of books from Holland were truly inadequate for an understanding of such disciplines as physics or mathematics. Thus, *Rangaku* can by no means be called an adequate preparation for the

Japanese encounter with Western science in the post-Perry era. Its inadequacy for dealing with the rest of Western knowledge need not be reiterated.

Nevertheless, despite the discovery that the information which had been obtained through the Dutch was only a fraction of the vast cornucopia which the West had to offer, it quickly became clear to the *Rangakusha* that their long and laborious years of effort directed at achieving some competence in the Dutch language and at acquiring through that tongue some information from Europe had not been entirely in vain. For the attitudes which, under great restrictions, officially and intellectually, had still fostered a curiosity about the West and which had led to the extensive development of Tokugawa *Rangaku* were clearly attitudes which were of value to modern Japan in its quest for international equality. Moreover, the opportunity for men of talent, often without regard to prior status, to be recognized in premodern Dutch studies set a meaningful precedent for the utilization of the 'best men' in the crash programme of Japanese modernization.

Perhaps what was most important for Japan's future so far as the possible contribution of *Rangaku* was concerned was the intriguing fact that, despite the limitations under which Dutch studies evolved under the shogunate, the *Rangakusha* had not hesitated to identify as superior and as worthy of adoption those European techniques which they were able to know in some depth. Once the country was opened and it became clear that Japan's survival as a viable nation-state was dependent on the rapid assimilation of virtually everything in the West, such a course was embarked upon with minimal opposition, even from the previously most virulent of *joi* proponents. Accordingly, it must be presumed that the high degree of adaptability which certainly facilitated Japan's rise to leadership in international political, economic and strategic terms was at least in part the result of the *Rangaku* experience.

Nevertheless, it is in my view an exaggeration of the importance of *Rangaku* and a misunderstanding of its true character to argue, as many have done, that the miscellany of curious delvings by *Rangakusha* into limited facets of Western technology provided a foundation on the basis of which Japan's rapid modern economic growth occurred. My conclusion on this possibility coincides with that of Professor Henry Rosovsky who has written so tellingly:

Our inclinations would be to discount these developments rather heavily as far as their relation to MEG (Modern Economic Growth) is concerned. The examples are isolated, and while they may testify to considerable intellectual ferment within an extremely restricted sphere of society, this is not the stuff of which industrial revolutions are made. It would be almost like saying that Leonardo da Vinci's experiments were a sign of the beginning of the industrial revolution.¹⁰

Notes
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NOTES

CHAPTER I INTRODUCTION

- 1 Hereditary family of military rulers (shogun) who controlled Japan from 1600 to 1868.
- 2 Although Ieyasu was victorious in 1600, his investiture by the emperor did not take place until 1603. In 1605, Ieyasu retired in favour of his son Hidetada (1519–1632) in order to secure the succession of his family.
- 3 Literally 'tent government', Bakufu refers to the military power structure headed by the shogun, who held practical political authority and was 'invested' by the emperor, who, as leader of the civil government, held theoretical power.
- 4 Under the third Shogun Iemitsu (1603–51) all the people had to register at Buddhist temples, but this was a manifestation of the anti-Christian policy rather than a means of giving official support to Buddhism.

CHAPTER II THE DUTCH AT HIRADO

- 1 It was thought to be Usuki Bay (Itazawa Takeo, *Nichiran boekishi* (A history of Dutch–Japanese trade), 16).
- 2 Ibid. See also Tsuji Zennosuke, *Zotei kaigai kotsushiwa* (Story of the history of overseas contacts), 490 ff.
- 3 J. Murdoch and I. Yamagata, *A History of Japan*, 465.
- 4 An island off the northwest coast of Kyushu, Hirado had from early times carried on commerce with Korea, and from the end of the Ming Period (1368–1644) many Chinese pirates came there. From the middle of the seventeenth century the Matsuura daimyo had been eager to attract Western trade to his harbour. However, his anti-Christian attitude had driven the Portuguese to seek another centre for their commerce. Thus, when the daimyo of Hirado heard of the arrival of the 'heretic' Hollanders, he engaged some of the crewmen of *de Liefde* as gunnery instructors hoping to attract the commerce of their fellow countrymen. It was also he who provided transportation for Quaeckerneck when the latter left Japan.
- 5 Copies of this patent may be seen in Itazawa, op. cit., 513.
- 6 Nagasaki in the seventeenth century had been a mere fishing village under the control of Omura Sumitada, the first Christian daimyo. It was the Jesuits who selected Nagasaki to be a port city for Portuguese trade and at whose behest from 1571 on the town was developed.
- 7 Quoted in V. M. Golownin, *Memoirs of a Captivity in Japan*, lxviii.
- 8 All dates for the tenures of the *opperhoofden* are taken from Itazawa

Takeo, 'Oranda kokuritsu bunshokan ni zonsuru nichiran tsukoshiryo toku ni shokan nisshi ni tsuite' (About materials on the history of Dutch-Japanese relations, especially the *Dagregister*, in the Dutch National Archives), 19-31.

- 9 Quoted in Nagazumi Yoko, 'Japan's isolationist policy as seen through Dutch source materials', 34.
- 10 This same edict prohibited foreign travel by any Japanese and effectively ended overseas trade by banning the construction of any ship with a capacity of over 2,500 bushels.
- 11 Up to the beginning of the eighteenth century the profit for the Hollanders on their annual trade with Japan was over 50 per cent, thus making it the richest Dutch trading post in the East:

<i>Decade</i>	<i>% of profit</i>
1641-9	49
1650-9	68
1660-9	71
1670-9	75
1680-9	65

(Abe Makoto, 'Sakokugo' (After closing the country, 190-91). The principal Dutch import into Japan was raw silk though it proved to be the least profitable proportionately. Cottons and woollens from Europe yielded a steady and sizable profit. Other imports brought not only from Europe but from Africa, the Middle East and Asia included lead, tin, spices, sugar, jewellery, knick-knacks, drugs, deer hides, shark skins, straw piece goods, aloes wood, gauze, white sandalwood, purple sandalwood, ginseng, sweet grass, musk, coconuts and coconut oil, catechu, sulphur, saltpetre, verdigris, benzoin, ivory, rattan, oil of cajeput, bull horns, sea cow tusks, antlers, red alum, tortoise shell, hooves, leather, mother of pearl, coral, amber, rock-crystal, glass, pickled vegetables, watches, cinchona bark, alarm clocks, saffron, wax, loadstones, soap, cough syrup, gum arabic, snuff, microscopes, eyeglasses, telescopes, brazilwood, buffalo horns, quick-silver, cinnabar, borax, black and red lead pencils, mangos and other pickled fruits, files, needles, drinking glasses, bar-iron, chinaroot, treacle and liquorice. Perhaps the most curious Dutch import was 'unicorn horns' which were in reality the single long, twisted, pointed tusk of the narwhal (*Monodon monoceros*) and for which the Japanese were willing to pay dearly since they believed these 'horns' to have extraordinary curative, life-prolonging and memory-building powers. Many of the more unusual items brought a very high price on the Japanese market when they were first introduced. However, as soon as the novelty wore off, the Japanese often sold them back to the Dutch at low prices, and the Dutch were able to resell such items elsewhere.

Goods exported from Japan by the Dutch consisted primarily of gold and gold objects, silver coins and silverware, copper, camphor, porcelainware, lacquerware and grains. Other exports included umbrellas, canes, handicrafts of all kinds, oil paper, rice, sake, soy sauce and Japanese kimonos.

Without detailing here the various vicissitudes in the conduct of this trade, it can be stated that this relationship had three significant effects: (1) it provided an impetus to the development of Japanese industries by the propagation of such products as silk, cotton and iron; (2) it helped the rising Japanese merchant class to gain, in some respect at least, a realization of the value of foreign trade; (3) it furnished the *modus operandi* for the Dutch remaining in Japan throughout the *sakoku* period thus keeping slightly ajar the door through which knowledge of the West could enter.

- 12 Quoted in Murdoch and Yamagata, *A History of Japan*, 676.
- 13 H. Nagaoka, *Histoire des relations du Japon avec l'Europe aux XVIe et XVIIe siècles*, 117.

CHAPTER III THE ISLAND OF DESHIMA

- 1 General descriptions of the island can be found in most of the writings of Itazawa Takeo, for example in *Rangaku no hattatsu* (The development of Dutch studies), in *Iwanami koza Nihon rekishi*.
- 2 The Chinese, too, were quartered at Nagasaki. 'The Chinese abode is a place called Juzenji Mura. At the east of the harbor on the outskirts of the city there is a place called Umegasaki where the Chinese ships anchor. Facing this is a temple called Daitokuji. Below is a common. At the right on a high place is a village called Kojima. Between this village and the temple is the [Chinese compound]' (quoted in G. K. Goodman, 'A translation of Otsuki Gentaku's *Ransetsu benwaku*', occasional papers, Center for Japanese Studies (Ann Arbor: University of Michigan Press, 1952), 3, 87).
- 3 This included the city itself plus the surrounding villages, an area which in 1739 had a revenue of 3,000 *koku*: Jingushicho (The Great Shrine Office), *Koji ruiien* (Encyclopedia of ancient matters), vol. 17, 839.
- 4 The other two were Oda Nobunaga (1534–82) and Tokugawa Ieyasu.
- 5 Actually the number of Nagasaki *bugyo* varied as follows after 1633: 1686 – 3 *bugyo*; 1700 – 4 *bugyo*; 1713 – 3 *bugyo*; 1714 – 2 *bugyo*; 1843 – 1 *bugyo*; 1846 – 2 *bugyo* (Yashiro Kuniharu, Hayakawa Junzaburo and Inobe Shigeo, *Daizotei kokushi daijiten* (Further revised and supplemented dictionary of Japanese history)).
- 6 *Hatamoto* (literally: at the foot of a standard) formerly had meant the camp of a shogun and after that the samurai who guarded the camp. Under the Tokugawa the *hatamoto* were direct vassals of the shogun ranking below the daimyo and were under the supervision of the *waka-doshiyori*. There were some 5,000 *hatamoto*. (G. B. Sansom, *Japan: A Short Cultural History*, 456 and 464.)
- 7 The shogun's palace at Edo was divided into many rooms, all of which were specifically named. A retainer's status was determined according to the room in which he was privileged to take his place.
- 8 1 *koku* = 4.9629 bushels.
- 9 In general, fiefs were measured in *koku* and stipends in *hyo*. The two

terms of rice capacity were often used loosely or interchangeably. This was because the *hyo* in theory represented the tax yield from one *koku* of a fief.

- 10 Nihon keizaishi kenkyujo, *Nihon keizaishi jiten* (Dictionary of Japanese economic history), II, 1222.
- 11 Itazawa, *Rangaku no hattatsu*, 16.
- 12 *Fuchi* (rations) were calculated on the basis of the amount of rice considered necessary to support one individual for one month. This was equivalent to approximately 0.4 *hyo* per month per man.
- 13 Itazawa, *Rangaku no hattatsu*, 22.
- 14 1 *ken* = 1.99 yd.
- 15 1 *tsubo* = 3.95 sq. yd.
- 16 Itazawa, *Rangaku no hattatsu*, 10.
- 17 The number of Dutch ships coming to Nagasaki each year varied according to the period. In 1658 there were 10 ships, in 1661, 11 ships and in 1665, 12 ships, but in 1698 there were 7 ships and after 1701 only 4 or 5. By 1716 the number had diminished to 2 ships, and from 1790 to the 1850s only 1 ship per year arrived. (Itazawa Takeo, *Nichiran bunka koshoishi no kenkyu* (A study of the history of Japanese–Dutch cultural relations), 181.)
- 18 1 *kamme* (or 1 *kan*) = 8.27 lb.
- 19 Itazawa Takeo, *Nichiran boekishi* (A history of Dutch–Japanese trade), 61.
- 20 Itazawa, *Rangaku no hattatsu*, 12–13.
- 21 Such titles as *opperchirurgijn*, *onderchirurgijn*, *geneeskundige dienst* and *doctor* were also used.
- 22 J. Murdoch and J. H. Longford, *A History of Japan*, 210.
- 23 E. Kaempfer, *The History of Japan*, II, 178–86.
- 24 Thomas B. Rundall (ed.), *Memorials of the Empire of Japan*, xxv. This referred to the *fusetsugaki* or annual reports on world conditions which the Hollanders were required to submit. These are described in detail in Itazawa Takeo, *Oranda fusetsugaki no kenkyu* (A study of the Dutch reports). These reports which began to be submitted in 1644 were primarily concerned with news of Spain and Portugal whose activities in Asia continued to hold the attention of the Bakufu because of their obsessive fear of the Iberian attempt to spread Christianity. Eventually, however, the *fusetsugaki* were expanded to encompass news of all the European nations and of the Indies and China as well. Towards the middle of the nineteenth century, as foreign pressure increased, the Hollanders also presented the shogunate with additional special reports called *Betsudan fusetsugaki*. Much of the information in these latter notices was concerned with the United States, e.g. political changes, the discovery of gold, population growth and naval power. It was from the *Betsudan fusetsugaki* that the Japanese received advance notice of the coming of Perry.
- 25 Karl Thunberg, *Voyages de C. P. Thunberg au Japon par le Cap de Bonne-Espérance, les Isles de la Sonde, etc.*, III, 45 (my translation). With much difficulty Thunberg himself obtained permission to examine plant

life in the nearby countryside, but on every excursion he was closely attended by 20 to 30 Japanese for whom an appropriate feast had to be provided.

- 26 John Z. Bowers, *Western Medical Pioneers in Feudal Japan*, 22.
- 27 Quoted in Kaempfer, op. cit. 264.
- 28 Quoted in R. Hildreth, *Japan as It Was and Is*, 487.
- 29 1 *momme* (or 1 *me*) = 3.75 grams.
- 30 Takekoshi Yosaburo, *The Economic Aspects of the History of the Civilization of Japan*, II, 148.
- 31 T. Yoshida, 'The *Rangaku* of Shizuki Tadao: the introduction of Western science in Tokugawa Japan', 54–5.

CHAPTER IV VISITS TO EDO

- 1 Permission to make the *hofreis* was granted to the Dutch in 1609, and the annual visits began in 1633. From 1764 the trip was made every two years and after 1790 every four years. From 1633 to 1850 there were 116 visits to Edo.
- 2 'Yet onerous and troublesome as these annual missions to the Shogun's court were, the Chinese . . . were exceedingly eager to be allowed to send a yearly embassy to Yedo. This they were debarred from doing on the ground that they were merchants, representing no political interest whatsoever whereas the President of the Factory in Deshima was not merely a trader but the representative of a corporation whose territorial possessions counted as Dutch national colonies'. (Murdoch and Longford, *A History of Japan*, 293.)
- 3 H. W. Wildes, *Aliens in the East*, 49.
- 4 Ibid.
- 5 Ibid.
- 6 Kaempfer, *The History of Japan*, II, 278.
- 7 'In Wagenaer's time we find that one of these missions cost the Company 15,636 gulden for presents and 14,356 gulden for travelling expenses. Towards the end of the seventeenth century the total outlay on the annual mission to Yedo usually amounted to over 60,000 gulden'. (Murdoch and Longford, *A History of Japan*, 293.)
- 8 Until 1659 the Nagasaki–Shimonoseki portion of the journey had been made by sea.
- 9 This audience with the shogun was called 'Kubosama Orandajin Goran' (The viewing of the Hollanders by the shogun). The great Japanese poet Basho (1644–94) wrote, 'Kapitan mo tsukubawasekeri kimi ga haru' (The *opperhoofd* too prostrates himself in the presence of the shogun).
- 10 Refers to Abe Masatake who served as *roju* from 1681 to 1704 and who was known as *Bingo no kami* (an honorary title corresponding to governor of the province of Bingo). (Tokyo Teikoku Daigaku Shiryo Hensanjo, *Tokushi biyo* (Handbook of Japanese history), 235.)
- 11 Kaempfer, *The History of Japan*, III, 93.

- 12 Ibid., 167–8.
- 13 Some idea of the extent of the expense incurred by the Hollanders may be gathered from a list of the presentations for the year 1818 (Kokusho kankokai (Society for the Publication of National Literature), *Tsuko ichiran* (A synopsis of communication by sea), Tokyo: Kokusho kankokai, 1913, VI, 200):
- | <i>Officials</i> | <i>Amount*</i> |
|---|---|
| <i>Roju</i> (senior councillors) | 5 <i>kamme</i> |
| <i>Wakaroju</i> (junior councillors known as <i>waka-doshiyori</i>) | 2 <i>kamme</i> |
| <i>Jishabugyo</i> (superintendents of temples and shrines) | 1 <i>kan</i> , 100 <i>me</i> |
| <i>Shihaikata</i> (general superintendents) | 2 <i>kan</i> , 300 <i>me</i> |
| <i>Edo machibugyo</i> (chief administrator of Edo) | 1 <i>kamme</i> |
| <i>Kyoto shoshidai</i> | 1 <i>kan</i> , 700 <i>me</i> |
| <i>Kyoto machibugyo</i> (chief administrator of Kyoto) | 700 <i>me</i> |
| <i>Osaka machibugyo</i> (chief administrator of Osaka) | 400 <i>me</i> |
| <i>Hyakunin Goban Gashira Shu</i> (captains of the Hundred-man Guard) | 60 <i>me</i> |
| <i>Okachimetsuke shu</i> (inspectors, foot-soldier class) | 30 <i>me</i> |
| <i>Onbozushu</i> (tea ceremony attendants) | 50 <i>me</i> |
| <i>Onkyujin</i> (servants) | 2 <i>kan</i> , 60 <i>me</i> |
| <i>Shitayaku</i> (subordinate officials) | 1 <i>kan</i> , 100 <i>me</i> |
| 2 <i>machitsukai</i> (messengers) | 250 <i>me</i> each |
| 2 <i>hissha</i> (scribes) | 230 <i>me</i> |
| 2 <i>ryorinin</i> (cooks) | 130 <i>me</i> |
| 3 <i>Nagasaki saji</i> (Nagasaki detached officials) | 20 <i>me</i> each |
| <i>Edo Nagasakiya Gen'uemon</i> (proprietor of the Edo <i>Nagasakiya</i>) | 1 <i>kan</i> , 200 <i>me</i> , and
20 <i>me</i> to each of his
servants |
| <i>Miyako Ebiya Youemon</i> (proprietor of the place where the Dutch stayed in Kyoto) | 1 <i>kan</i> , 100 <i>me</i> |
| <i>Osaka Nagasakiya Gorouemon</i> (proprietor of the Osaka <i>Nagasakiya</i>) | 1 <i>kan</i> , 100 <i>me</i> |
| <i>Shimonoseki Shuku</i> (Inn at Shimonoseki) | 40 <i>me</i> |
| * 1,000 <i>me</i> = 1 <i>kan</i> (or 1 <i>kamme</i>) | |

CHAPTER V THE NAGASAKI INTERPRETERS AND EARLY MEDICAL AND ASTRONOMICAL STUDIES

- 1 The term *Oranda tsuji* (Dutch interpreter) was first used in 1640. (Nagasaki shiyakusho (Municipality of Nagasaki), *Zoho teisei Bakufu jidai no Nagasaki* (Nagasaki under the Bakufu), 173.)

- 2 Itazawa Takeo, *Rangaku no hattatsu*, 17.
- 3 Nagasaki shiyakusho, op. cit., 173. The Dutch translated *metsuke* as *dwarsskijker* (spy).
- 4 Ibid. and Itazawa, *Rangaku no hattatsu*, 17.
- 5 Ibid. This figure of 140 may be compared with Kaempfer's figure of 'no less than 150 persons' (*The History of Japan*, II, 198) in order to indicate that the established number of interpreters was highly flexible. This may be perhaps accounted for by the hereditary nature of the interpreter corps. That is, jobs were always found for members of these families.
- 6 Kaempfer, op. cit., II, 198–205.
- 7 Itazawa, *Rangaku no hattatsu*, 17.
- 8 Including branch families the total number of hereditary interpreter families for the Dutch language reached thirty-five by the middle of the nineteenth century.
- 9 Itazawa, *Rangaku no hattatsu*, 24. Since Portuguese had been the *lingua franca* of the Far East before 1641, no particular study of the Dutch language had been made by the Japanese. Nishi Kichibei (d. 1666) served as both *Nambanotsuji* (senior interpreter of Portuguese) and *Oranda otsuji* (senior interpreter of Dutch).
- 10 Itazawa, 'Oranda kokuritsu bunshokan . . . ', 38.
- 11 Ibid., 27.
- 12 Ibid.
- 13 S. Sakanishi, 'Prohibition of import of certain Chinese books and the policy of the Edo government', 290.
- 14 Ibid., 291.
- 15 Itazawa, *Rangaku no hattatsu*, 27.
- 16 Sakanishi, op. cit., 291.
- 17 Ibid., 295.
- 18 The significance of Chinese books as a source of information about the West may be seen by reference to H. Bernard, 'Traductions chinoises d'ouvrages européens au Japon durant la période de fermeture, 1641–1853', 40–60.
- 19 Itazawa, *Rangaku no hattatsu*, 28.
- 20 This was probably *Opera quae extant omnia* (Amsterdam, 1645) by Adriaan van der Spieghel (Adr. Spigelius).
- 21 *Cruydeboeck, in den welcken die geheele historie, dat es tgheslacht, tfatsoen, naem, naturere, cracht ende werckinghe van den cruyden . . .* Thantwerpen, 1563; *Herberius oft cruydt-boeck*, Leyden, 1618.
- 22 *Naeukeurige beschrijving van de natuur der vier-voetige dieren, vissen en bloedloze dieren, vogelen, kronkel-dieren, slangen en draken*.
- 23 In 1675, the Dutch, distressed by the quality of the interpreters' Dutch, sought permission to learn Japanese but were refused.
- 24 Itazawa, *Rangaku no hattatsu*, 29.
- 25 See chapters IX and XI respectively.
- 26 Inobe Shigeo, 'Rangaku no kigen' (The origins of Dutch studies).
- 27 Nakamura Kiyozo. 'Edo Bakufu no kinsho seisaku' (The Edo Bakufu policy of banning books), *Shirin*, 555.
- 28 Quoted in Inobe, op. cit., 65.

- 29 Ibid., 66.
- 30 Quoted in Takahashi Shin'ichi, *Yogakuron* (Essay on Western learning), 59–60.
- 31 J. P. Kleiweg de Zwaan, *Völkercundliches und Geschichtliches über die Heilkunde der Chinesen und Japaner mit Besonderer Berücksichtigung Holländischer Einflüssen*, 456.
- 32 Itazawa, *Rangaku no hattatsu*, 24.
- 33 Tsuji Zennosuke, *Zotei kaigai kotsushiwa* (History of Japanese intercourse with foreign countries), 732.
- 34 Mori Koichi, trans., 'Rangaku kotohajime (Die Anfänge der "Holland-Kunde")', 148.
- 35 *De chirurgie ende alle de opera, ofte weken van-. Nu eerts uit de franzoysche in onse ghemeyne nederlandsche sprake ende wt de vierde editie overgheset door Cr. Battus*. Met fig. (Dordrecht, 1592; Amsterdam, 1649).
- 36 Tsuji, op. cit., 732.
- 37 Ibid.
- 38 Shin is probable a mistake for *ban*.
- 39 Mori, op. cit., 148.
- 40 Mikami Sanji, *Edo jidaishi* (History of the Edo period), 661.
- 41 Mori. op. cit., 148.
- 42 The post of *shomotsu bugyo* had the responsibility for the custody of and expenditure for books for the Bakufu. The office was under control of the *wakadoshiyori* and carried a stipend of 200 *hyo* and rations for seven men. From the time of its establishment in 1634 there were four *shomotsu bugyo*. (Yashiro, Hayakawa and Inobe, *Daizotei kokushi daijiten*, 1450.)
- 43 *Komo* (red-hair) was a generic term taken from the Chinese *hung-mao* (red-hair). The Chinese used the word to designate both the English and the Dutch. Traditionally in East Asian culture, red hair was an attribute of demons.
- 44 One of the 'fringe benefits' for the interpreters was the opportunity to carry on with the Dutch a significant amount of clandestine trade for personal aggrandizement.

CHAPTER VI ARAI HAKUSEKI AND INTELLECTUAL DEVELOPMENTS IN GENROKU AND SHOTOKU

- 1 G. B. Sansom, *Japan: A Short Cultural History*, 471.
- 2 Famous for his scholarly inquiries into Japanese antiquity, especially the *Dai Nihonshi* (Great history of Japan), a 243-volume work which raised the prestige of the imperial dynasty. Mitsukuni protected and encouraged Shintoism to the detriment of both Confucianism and Buddhism.
- 3 Mito was one of the *Sanke* (Three Families) or three branches of the Tokugawa family descended from the last three sons of Ieyasu. When a shogun died without an heir, a successor had to be chosen from one of the *Sanke*.
- 4 A patron of literature, science and the arts.

- 5 Leader in Kyoto of the revival of ancient Japanese literature and the first systematic opponent of Chu Hsi. For a complete description, see J. Spae, *Ito Jinsai, A Philosopher, Educator and Sinologist of the Tokugawa Period*.
- 6 Sorai took the view that man was incurably bad and that 'in order to govern a state it was necessary for exceptional superior men . . . to invent a code of morality for the people to follow. . . '. (G. B. Sansom, *The Western World and Japan*, 207.)
- 7 Quoted in Spae, op. cit., 74.
- 8 Son of Ito Jinsai.
- 9 Quoted in Itazawa Takeo, *Rangaku no hattatsu*, 45.
- 10 A small island off the southern tip of Kyushu.
- 11 An enclosure in Koishikawa, Edo, where foreign missionaries who entered Japan after the prohibition of Christianity were confined and interned.
- 12 Hendrik Dijkman, *opperhoofd* from 7 November 1694 to 27 October 1695.
- 13 Tsuji Zennosuke, *Zotei kaigai kotsushiwa*, 734.
- 14 Nakazawa Sumio, 'Edo jidai seiyobunka yunyu no kokyo ni kankei seru kakuretaru baikaisha' (Concealed intermediaries in the Edo Period who were concerned with official permission for the importation of Western culture), 51.
- 15 Tsuji, 734.
- 16 Quoted in Nakamura Koya, *Edo Bakufu sakoku shiron* (Treatise on the exclusion policy of the Edo shogunate), 561.
- 17 Quoted *ibid*.
- 18 '*Seiyo no geijutsu; Toyo no dotoku*.' Quoted in Takahashi Shin'ichi, *Yogakuron* (Essay on Western learning).

CHAPTER VII TOKUGAWA YOSHIMUNE AND WESTERN LEARNING

- 1 Kyoho was the name of the year period 1716-35.
- 2 E. Herbert Norman, 'Ando Shoeki and the anatomy of Japanese feudalism', 55.
- 3 Quoted in Takahashi Shin'ichi, *Yogakuron*, 95-6.
- 4 Much of the information for this and the subsequent sections is taken from Saito Agu, 'Tokugawa Yoshimune to Seiyo bunka' (Tokugawa Yoshimune and Western culture).
- 5 Quoted in S. Sakanishi, 'Prohibition of import of certain Chinese books . . . ', 29.
- 6 C. C. Krieger, *The Infiltration of European Civilization into Japan During the 18th Century*, 16.
- 7 Both Li Chih-tsau and Hsu Kuang-ch'i were pupils of Ricci.
- 8 1 *ri* = 2.44 miles.
- 9 Saito, op. cit., 1359.
- 10 Romanized by the Dutch.

- 11 David Brouwer (at Deshima from 5 November 1743 to 1 November 1744).
- 12 Saito, op. cit., 1362.
- 13 Ibid.
- 14 Later *opperhoofd* from 13 October 1737 to 21 October 1739.
- 15 Hendrik Durven, at Deshima from November 1721 to 18 October 1723.
- 16 Saito, op. cit., 1365.
- 17 In Japan from 13 October 1737 to 21 October 1789.
- 18 Saito, op. cit., 1366.
- 19 *De nieuw hervormde anatomie, ofte ontleding des menschen lichaams. Als ook een verhandeling van het balsemen der lichamen* (Amsterdam, 1678; 3rd edn 1696).
- 20 Kurita Motoji, *Edo jidaishi* (A history of the Edo period), 232.
- 21 160 momme = 1.32 lb.
- 22 This refers to another of the main currents of Tokugawa thought. It was characterized by a revival of interest in classical Japanese studies before they came under Chinese or Buddhist influence. *Kokugaku*, which has been called Shinto revivalism, was another aspect of the intellectual renaissance which had its inception in the Genroku-Shotoku era. Perhaps its most revolutionary facet was its emphasis on the position of the emperor and his divine origins.
- 23 Quoted in Saito, op. cit., 1376–7.
- 24 S. Nakayama, *A History of Japanese Astronomy: Chinese Background and Western Impact*, 167.

CHAPTER VIII AOKI KON'YO AND NORO GENJO

- 1 Quoted in C. C. Krieger, *The Infiltration of European Civilization into Japan During the 18th Century*, 28.
- 2 There were five *rusui* (keepers of Edo Castle) under the *roju*.
- 3 Quoted in P. Sippel, 'Aoki Konyo (1698–1769) and the beginnings of *Rangaku*', 14.
- 4 Based on J. Remmelinus (Johann Remmelin), *Ontleiding van het mensehelijk vertiimd word*, Amsterdam, 1667.
- 5 Quoted in the original Dutch in Itazawa Takeo, *Nichiran bunka koshoshi no kenkyu* (A study of the history of Japanese–Dutch cultural relations), 213.
- 6 In addition to the works of Kosaku the contributions of his sons Kensaku (1770–1825) and Gonnosuke (1785–1831), his nephew Kosai (1757–1813), his grandson Nanko (1787–1843) and his close relative Chuzaburo (1788–1833) made the name Yoshio widely known in the fields of medicine, language study, astronomy and gunnery.
- 7 This work was based on the first section on urine in the book *Verhandeling van de uitwerpingen des menschelyken ligchaams, bestaande in pis, afgang, sweet, kwyl en braaking, waar nevens aangevoed is een verhandeling van de menschelyke gematigheden in maatgedicht* (Amsterdam, 1706; Rotterdam, 1731 and 1756), by Henricus Buizen.

- 8 *Verhandeling over de venusziekten. Uit het Lat. vert. en met aenteekeningen, benevens een korte verhandeling over den oorsprong der venusziekte, volgens A.R. Sanches, vermeerd. door Lamb. Nolst.* (Rotterdam, 1781; 2e verb. dr. 1787).
- 9 S. Kure, 'Entfluss der Fremden insbesondere der Deutschen Medizin auf der Japanischen', 373.
- 10 *Materia chirurgica, of verhandeling over de werkingen der middelen, die in de heelkunde gebruiklyk zyn.* Uit het Hoogd. vert. door Barth. Tersier (Utrecht, 1772; Amsterdam 1808).
- 11 Quoted in Yamagata Shozo, 'Tokugawa jidai ni okeru Rangaku no hattatsu ni tsuite' (Concerning the development of Dutch studies in the Tokugawa Period), 743.
- 12 An interesting parallel may be drawn with some of the social reforms proposed by the aforementioned *kogakusha* Ogyu Sorai. Some of the practical recommendations he made in his *Seidan* (Chats on administration) included: 'the keeping of family registers by an official of the government, the settling of samurai families on the land (away from the cities), the opening of land in north-eastern Japan, the abolition of mendicancy, the division of large estates and the limiting of a maximum income, the promoting of thrift, the modernizing of the educational system, etc.' (Spae, *Ito Jinsai*, 80).

CHAPTER IX THE KOHOKA, MAENO RYOTAKU AND SUGITA GEMPAKU

- 1 E. H. Norman, 'Ando Shoeki and the anatomy of Japanese feudalism', 18.
- 2 Refers to the period during which Japan was ruled by shoguns from the Ashikaga family.
- 3 Kurita Motoji, *Edo Jidaishi* (A history of the Edo period), 230.
- 4 'The Chinese word *ch'i* in modern speech means "air", "gas", "vapour", "breath", "temper." In its philosophical sense it has been variously translated. Giles gives it as "the vivifying principle or aura of Chinese Cosmology". Wells Williams renders it "the ether, the aerial fluid, the vital force or fluid, the primordial aura". McClatchie in his translation of the *Li Ch'i* . . . takes *ch'i* to be "air" and consistently all through his books boldly translates it by this word. He sees in it an evidence of the similarity between Chinese philosophy and that of Greece and Rome. . . . McClatchie, however, hardly does justice to the word *ch'i* as used by the Chinese philosophers. Whatever it may be, it is not air such as surrounds us in our atmosphere. . . . To translate it, therefore as "air" is misleading. LeGall in his work on the same subject translates *ch'i* as *matière*, which is nearer the mark, for *ch'i* undoubtedly represents the material element in the dual constitution of the universe, and often it is best represented by the English word "matter". . . . Beyond the solid, or the liquid, or the gaseous, there is *ch'i*, the primordial substance or plenum, invisible and intangible, the source from which spring all

phenomena, the basis, not only of all that we call matter, but of every form of existence, material or spiritual, physical or psychical. Where this aspect of *ch'i* is prominent, the word Ether is the more appropriate word to express its meanings.' (J. P. Bruce, *Chu Hsi and His Disciples*, 101–3). It is important to note that Chu Hsi 'made distinctions between the pure and the impure, and between the sound and unsound *ch'i*.' (Fung Yu-Lan, *The Spirit of Chinese Philosophy* 189.)

- 5 Previously Chinese-inspired family sentiment and the attitude of the Confucianists toward the supposed inviolability of the human body had made Japanese physicians reticent to perform surgery. The study of anatomy was also extremely difficult due to the reverence for the dead which made it impossible to work with corpses.
- 6 Achiwa Goro, 'On the first anatomical chart in Japan', 200.
- 7 Quoted in J. Z. Bowers, *Medical Education in Japan from Chinese Medicine to Western Medicine*, 66.
- 8 Another dissection took place on 27 May 1758 at Fushimi, Hirado Island, conducted by the Nagasaki interpreter–physician Irako Mitsuaki (1737–98). Again, on 21 June 1759 in Hagi *han*, an autopsy of a seventeen-year-old girl was carried out, the first of a female in Japanese medical history. Also, on 25 March 1800 a post mortem of a 37-year-old female took place at Yoshijima execution grounds in Osaka. Diagrams were made of an experiment conducted on this corpse whereby black ink (*sumi*) was poured through the cadaver in order to understand the function of the kidney in urination.
- 9 Kurita, op. cit., 230.
- 10 W. N. Whitney, 'Notes on the history of medical progress in Japan', 323.
- 11 S. Kure, 'Entfluss der Fremden insbesondere der Deutschen Medizin auf der Japanischen', 376.
- 12 Kure, op. cit., 377.
- 13 Ibid., 372–8.
- 14 Fukui Kyuzo, *Shodaimyo no gakujutsu to bungei no kenkyu* (A study of the arts and the sciences of various daimyo), 323.
- 15 For many of Ryotaku's writings on the Dutch language, he seems to have found especially helpful Pierre (Pieter) Marin, *Nouvelle Méthode pour apprendre les principes de l'usage des langues françoise et hollandoise* (Dutch title: *Nieuwe Fransche en Nederduitsche spraakwijze, vermeerderd met een uitvoerigesyntaxis of woorden-schikking*) (Amsterdam, 1762).
- 16 This was a translation of *Atlas nouveau* by the French geographer Nicolas Sanson (1600–67) published in Paris in 1692, a copy of which had been presented to Kuchiki Masatsuna by the *opperhoofd* Isaac Titsingh (1745–1812) in 1780.
- 17 Fukui, op. cit., 32.
- 18 Krieger, op. cit., 68.
- 19 Ryotaku often signed correspondence with the romanized name 'M. Liotack'.
- 20 In 1777 with funds provided by his domain, Sugita Gempaku purchased from the Nagasaki interpreters accompanying the Dutch mission to Edo copies of *Ontleedkundige tafelen* and *Anatomia nova* by Casparus Barthol-

- inus (1588–1621), a Danish anatomist. (Numata, *Yogaku denrai no rekishi* (History of the transmission of Western learning), 63.)
- 21 *Ontleeding des menschelijken lichaems beschreven en in verscheydene figuren afgebeeld* (Amsterdam, 1675).
 - 22 *De ossibus et cartilaginibus corporis partium tabulae* (Bologna, 1566); *Externarum et internarum principalium humani corporis partium tabulae* (Nurnberg, 1572).
 - 23 *Anatomia: ofte ontleding des menschelijken lichaems. Hier zijn bij gevoeght 2 brieven van Joh. Walaëus, raeckende de beweginge des gijls ende bloets, enz.* (met fig. In de Nederl. spraecke overg. door Thom. Staffard., Dordrecht, 1656. 2e dr. 's-Gravenhage, 1658).
 - 24 *Heelkonstige ontleding van 's menschen lighaam* (met fig., Leyden, 1718, 2e dr. met aanmerk, verm. met pl., 1733).
 - 25 *Konstige ontledingh des menschelijken lichaems* (uit het Lat. vert. door Ger. Blasius, Amsterdam, 1659 & 1661),
 - 26 Ma Eikoh, 'The impact of Western medicine on Japan: memoirs of a pioneer, Sugita Gempaku, 1733–1817', Part 1, 69.
 - 27 This was formerly the *Saijukan* founded in 1765 at Edo by the Taki family of physicians who had an eclectic view of combining the old medicine with the new. It came under Bakufu auspices in 1791.
 - 28 For a complete description of Russian incursions in the eighteenth century, see Donald Keene, *The Japanese Discovery of Europe*, chapter 3 ('Strange tales from Muscovy'), pp. 39–72.
 - 29 Nakamura Koya, *Edo Bakufu sakoku shiron*, 557.
 - 30 The Fujiwara dated at least from the beginnings of recorded Japanese history and were known for their chosen connection with the Imperial family and its activities.
 - 31 A great samurai family in the Satsuma *han*.
 - 32 If Maeno Ryotaku and Sugita Gempaku can be called the founders of *Rangaku* at Edo, then Koishi Genshun (1743–1808) can be similarly described for Kyoto. After studying *kohoka* medicine under Nagatomi Hosuke at Osaka, in 1762 Genshun went to Nagasaki to learn Dutch medical methods from Yoshio Kosaku. Greatly impressed by *Kaitai shinsho* and influenced by frequent contact with both Sugita Gempaku and Otsuki Gentaku at Edo and at Kyoto, Genshun wrote *Kaizo zushi* (Chart of the internal organs of a male corpse) (1798) after viewing an autopsy at Seiyakuin, a charity hospital in Kyoto.

CHAPTER X THE ADVENT OF HELIOCENTRICITY

- 1 The calendar was unusually important in Japan since it contained a forecast of both meteorological phenomena and weather for the entire year.
- 2 B. Szczesniak, 'The penetration of the Copernican theory into feudal Japan', 53.
- 3 D. Bodde, 'Dominant ideas', 21.
- 4 Quoted in Chan Wing-tsit, 'Neo-Confucianism', 257.

- 5 Wood, fire, earth, metal, water.
- 6 Quoted in G. W. Knox, 'Ri, Ki, and Ten', 160, 165, 166.
- 7 The Portuguese or Spaniards originated this myth, and the Dutch actually searched for these islands off the East Coast of Japan in 1643.
- 8 Quoted in Abe Makoto, 'Kagakuteki uchukan-chikyusetsu, chidosetsu ni tsuite' (About the scientific view of the universe-globalism, heliocentricity), 332.
- 9 Quoted *ibid.*, 333–4.
- 10 Son and heir of Hideyoshi. Hideyori was overthrown by Tokugawa Ieyasu.
- 11 Razan was a fervent supporter of Chu Hsi's Neo-Confucianism and was responsible for getting Ieyasu to adopt it as the official philosophy of the Bakufu. Razan became rector of the governmental Confucian school Shoteiko.
- 12 It is interesting to speculate on the extent to which the resistance of Japanese scholars to such ideas as global sphericity was a result of the tradition of respect for the past, for one's elders or one's forebears (e.g. parents, teachers, sages), a respect, of course, reinforced by Confucian teachings. Thus, what was new was by definition highly suspect, especially a concept so radical as that of the earth being round. 'Les Chinois et les Japonais aiment les choses anciennes. La tasse du thé, par exemple, le plus primitif le mieux, les sages anciens les plus sages'. (S. Yajima, 'De l'inertie de la pensée humaine – ce qu'on voit à rencontre des deux civilisations hétérogènes', 154.)
- 13 A recent theory is that the book may well have been *In sphaeram Ioannis de Sacro Bosco, commentarius* (1607) by the German-born Jesuit mathematician and astronomer Christoph Clavius (1537–1612) (S. Nakayama, *A History of Japanese Astronomy*, 89–90).
- 14 Abe, *op. cit.*, 338–40.
- 15 *Ibid.*, 342.
- 16 S. Kure, 'Entfluss der Fremden insbesondere der Deutschen Medizin auf der Japanischen', 351.
- 17 S. Nakayama, *op. cit.*, 99.
- 18 C. C. Krieger, *The Infiltration of European Civilization into Japan During the 18th Century*, 5.
- 19 Abe, *op. cit.*, 344.
- 20 Quoted *ibid.*
- 21 Takahashi Shin'ichi, *Yogakuron* (Essay on Western learning), 62.
- 22 Krieger, *op. cit.*, 1.
- 23 *Ibid.*, 17.
- 24 Tsuji, *Zotei kaigai kotsushiwa*, 733.
- 25 Abe, *op. cit.*, 343.
- 26 Nakayama, *op. cit.*, 119 ff.
- 27 Other hereditary *tenmonkata* families were: Ikai, Nishikawa, Okumura, Yamaji, Yoshida, Takahashi, Adachi. The last four continued to serve until the Meiji Restoration. (Osaki Masatsugu, 'Tenmonkata zakko', 8.)
- 28 Quoted in Krieger, *op. cit.*, 9–10.
- 29 Otsuki Fumihiko, 'Edo jidai no Rangaku' (Dutch studies in the Edo Period), 464.

- 30 Harumi is quoted as writing that 'however well the Westerners argue theory, they are incompetent in the technical aspects of astronomy'. (Nakayama, op. cit., 107.)
- 31 In 1746 the *tenmonkata* were promoted from the rank of *jisha bugyo* (commissioner of shrines and temples) to that of *wakadoshiyori* (literally 'young elders'). The usual salary of a *tenmonkata* was 100 *hyo* plus rations for 5 to 10 persons, a sum equivalent to a samurai with a stipend of 100 to 120 *koku*. *Tenmonkata* also received bonuses for special services. (T. Yoshida, 'Dutch learning (*Rangaku*) in Japan: a quick review'.)
- 32 This replaced the observatory built by Yoshimune and which was destroyed in 1757. (Shimosawa Takashi and Hirose Hideo, 'Tenmon yashiki no tatemono ni tsuite', 2.)
- 33 Quoted in Abe, op. cit., 353.
- 34 Quoted *ibid.*, 348.
- 35 This refers to the Chinese dualistic concept of the universe represented by *yin* and *yang*.
- 36 Quoted in Abe, op. cit., 348.
- 37 In addition to the geographical information in *Komo tenchi nizu zeisetsu*, Kenshin advocated the idea that Japan was the centre of the world (*kakoku*) and that the Japanese script, *kana*, was *kaji* (middle writing). He placed Japan in the first rank as a separate continent and the then five great continents next in order; he also said that Japan should be called 'Fortis Yamato', the mighty Japanese continent or powerful Yamato. Thus it is noteworthy that there was during the *sakoku* period this view of the world with Japan as its centre. (Tsuji, op. cit., 734-5.)
- 38 Nakayama points out that Ryoei omitted in his translation those sections of the Dutch edition in which certain Biblical and theological references to God appeared. (S. Nakayama, 'Abhorrence of 'God' in the introduction of Copernicanism into Japan', 60.)
- 39 There were three methods of transposing Western names into Japanese, e.g. the names of scientists such as Copernicus: (1) from the Jesuit transposition of names into Chinese, i.e. in Chinese character transliteration; (2) from the original foreign language into katakana; (3) from the Dutch language into Chinese characters using the Japanese *on* readings.
- 40 Krieger, op. cit., 71.
- 41 Quoted in Krieger, op. cit., 70.
- 42 Quoted in French in Yajima, op. cit., 160.
- 43 Kokan called the new method *shashin* or 'copying truth' which is now the word for photography. (G. Sansom, *The Western World and Japan*, 233.)
- 44 Apparently the first explanation in Japanese of Western mathematical perspective appeared in a 1734 book based on the Dutch book *Algemeene manier van de Hr. Desargues tot de practijk de perspectieven . . .*, based on a manual by the French geometrician Gerard Desargues (1593-1662) (C. French, *Shiba Kokan*, 179).
- 45 Despite the lack of knowledge of the Dutch language, Kokan acquired a number of Dutch books whose illustrations not only were influential in his development as an artist but which he copied in his own paintings. His attempt to utilize Western ideas of perspective was greatly encouraged by

Groot schilderboek, waar in de schilderkonst in al haar deelen grondig werd onderwezen. . . (Amsterdam, reprinted 1743), by Gerard de Lairese (1640–1711). Among Kokan's paintings were those copied from such books as the Dutch revised translation of 1759 (*Iets voor allen*) of *Etwas für alle* (1699), a book of moral precepts for various occupations by Fr Abraham van Santa Clara (1644–1709); François Valentijn (1666–1727), *Oud en nieuw Oost-Indie* (Dordrecht and Amsterdam, 1724–6); and Johan Ludwig Gotfridi, *Historische chronyk*.

- 46 In China these characters were used for the name of the astronomer Johannes Kepler (K'o pai-erh) (1571–1630). Kokan apparently thought Kepler and Copernicus were one and the same. (French, op. cit., 187–8.)
- 47 As Russian and British incursions in East Asia increased, interest in strengthening national defence also increased. Tadao's *Kaki happoden* (The transmitted tradition of shooting firearms) (1787), derived from the writings of John Keill, is believed to be the first Japanese work to have described the Western method of calculating the speed and trajectory of a projectile.
- 48 That Tadao was particularly concerned about possible Russian advances towards Japan is evident in two of his works: *Roshiashi furoku* (Supplement to the history of Russia) (1795), based on translations from F. Valentijn's *Oud en nieuw Oost-Indie*, and *Nikoku kaimeiroku* (Record of the meeting of two countries) (1805), a translation dealing with the negotiation of the Russo-Chinese frontier in the Treaty of Nerchinsk (1689).
- 49 Recognizing the complexities of the translation work he had embarked upon, early in his career Tadao acquired a copy of *Nederduytsche spraak-kunst* (1708, 1712, 1733, 1756) by the linguist William Sewel (1654–1720). On the basis of Sewel's work, Tadao himself compiled a grammar called *Oranda shihinko* (Study of Dutch particles) which described the six cases, nine parts of speech and five moods in the Dutch language. Although *Oranda shihinko* was not published, revised versions of it by Nishi Kichiemon and by Baba Sajuro transmitted Tadao's knowledge of Dutch grammar to future students. A significant tribute to the language studies of Tadao is contained in the postscript of *Rangakuhan* (Overview of Dutch studies) (1816) by one of Tadao's disciples, Otsuki Genkan (Banri) (1785–1837):

In the study of Western literature there are three steps: first the letters, second the words, and third the composition of the words. The letters are the twenty-six letter alphabet of that country. After zealously learning the alphabet, one learns the various words, divides them into classes, and learns the parts of speech. Composition is the study of joining the words together. If one step is missing, it cannot be done. The first step is like going into the mountains and gathering timber; the second step is like fashioning beams and rafters with large, small, short, and long lumber; the third step is like constructing a large building using lumber already selected. Previous Dutch scholars who tried to translate using only knowledge of the letters are like those who go into the mountains, cut

- down trees, and without selecting beams and rafters and ignoring rules and regulations try to build a house. (Quoted in Itazawa Takeo, 'Jisho oyobi bumposho no hensan to Rangaku no hattatsu' (The compilation of grammars and dictionaries and the development of Dutch studies), 604.)
- 50 Keill was a Scottish mathematician and 'natural philosopher' who was a committed proponent of the ideas of Newton. Keill was first a lecturer and then a chaired professor at Oxford where the *Introductiones* were originally given as lectures to introduce and popularize Newtonianism. Lulofs obtained his doctor's degree from Utrecht in 1731, and in 1733 received a second degree from Leiden where he was appointed a chaired professor of mathematics and astronomy in 1742, adding philosophy in 1744. Lulofs had himself been trained in the Newtonian tradition by his mentors Willem 's Gravesande (1688–1741) and Petrus (Pieter) van Musschenbroek (1692–1761) who were, perhaps along with their fellow Newtonian Herman Boerhaave (1668–1738), the greatest scientific minds of eighteenth-century Holland. Lulofs reveals in the preface to his translation of Keill how important he thought it was for his fellow Netherlanders to become acquainted with Keill's work in order to understand better the current trends in astronomy and physics. It was this Dutch version of the Keill corpus which came into Tadao's possession sometime around 1780.
- 51 S. Nakayama, *A History of Japanese Astronomy*, 184.
- 52 'One of his pupils claimed for him the honor of having independently discovered the relationship between the distances of planets from the sun and the periods of their revolution (in other words, Kepler's third law), although he did not publish it' (quoted in Nakayama, op. cit., 190). According to Nakayama (ibid.), this was perhaps the only 'original achievement in the entire history of Japanese astronomy'.
- 53 The official astronomers were very angry at being shunted aside in calendar reform in favour of the outsiders Shigetomi and Yoshitoki, and they vented their spleen on the two newcomers from Osaka charging that their attempt to join together 'worldly matters' (the calendar) with the movements of heavenly bodies was improper.
- 54 *Astronomia of Sterrekunde, naar den tweeden, verbeterden en vermeerderen druk uit het Fransch vertaald door Arnoldus Bastian Strabbe* (1741–1805), Amsterdam, 1775.
- 55 Quoted in Nakayama, op. cit., 198.
- 56 In addition to his achievements in astronomy, Kagesuke studied the works on navigation of Jacob Swart (1796–1866).
- 57 Yuktaka eventually became director of the Banshowagegoyo and was involved in research on telegraphy.
- 58 Shibukawa Kagesuke and Adachi Nobuyuki (Sanai) collaborated on a final pre-Perry official calendrical treatise entitled *Shimpo rekisho* (Calendar book according to the new method) (1842).
- 59 Quoted in Otani Ryokichi, *Tadataka Ino, The Japanese Land Surveyor*, 73.
- 60 The first sketch maps in Japan were made in connection with the Taika land reforms of 645–9. The earliest known printed map of Japan

- appeared in 1596. (George H. Beans, *A List of Japanese Maps of the Tokugawa Era*, 8, 10.)
- 61 Sekisui learned the art of mapping from a Dutchman at Nagasaki. (D. C. Smith and Y. Mikami, *A History of Japanese Mathematics*, 264.)
- 62 Quoted in D. Keene, *The Japanese Discovery of Europe*, 112.
- 63 Ibid., 110.
- 64 Quoted *ibid.*, 111.
- 65 Nagata Hiroshi, *Nihon hokensei ideogoo* (The ideology of the Japanese feudal system), 289.
- 66 In the course of his research Tsurumine Shigenobu consulted Dutch grammars and attempted a new system of Japanese grammatical construction in his books *Gogaku kyuri kuhin kukaku sokatsu zushiki* (Language study research diagram showing the nine parts of speech and the nine cases) (1816) and *Gogaku shinsho* (New book of language study) (1833).
- 67 Itazawa, *Rangaku no hattatsu*, 83.

CHAPTER XI OTSUKI GENTAKU AND THE SPREAD OF RANGAKU

- 1 Quoted in Krieger, *The Infiltration of European Civilization into Japan During the 18th Century*, 73–4.
- 2 Masatsuna was himself one of the leading *Rangakusha* of this period. He had learned Dutch from the interpreter-scholar Yoshio Kosaku and was also a very close friend of the *opperhoofd* (1780–1 and 1782–4) Isaac Titsingh (1744–1812) with whom he carried on an extensive correspondence. Among Masatsuna's writings were: *Seiyo sempu* (Notes on Western coins) (1787) which contained a map of Europe with the boundaries clearly marked; *Shinsen sempu* (Notes on newly selected coins) (1790); and *Taisei yochi zusetsu* (Explanatory maps of the Western world) (1789) which was based primarily on Hubner's *Geographie* and which recorded European frontiers, rivers, natural features, history, internal divisions (provinces, states, etc.) and dependent countries. This work established the standard of geographical knowledge of foreign countries for its time.
- 3 Ogata Tomio, 'Rangakusha no Hipokuratesu gazo shuhai', in *Rangaku to Nihon bunka* (Dutch studies and Japanese culture), 321.
- 4 Dai Nihon Jisho Kankokai (Society for the publication of the biographical dictionary of Japan), *Shinteiban Dai Nihon jimmei jisho* (Biographical dictionary of Japan), I, 600.
- 5 Quoted in Itazawa, 'Jisho oyobi Bumposho . . .', 572–3.
- 6 Quoted in Krieger, *op. cit.*, 79.
- 7 Quoted in Keene, *The Japanese Discovery of Europe*, 33–4.
- 8 The 'six things' about which Gentaku made translations from Dutch were: narwhal (*unikoru*), saffron (*safuran*), nutmeg (*nikuzuku*), mummy (*mira*), Polyporus officinalis (*eburiko*) and mermaid (*ningyo*).
- 9 Morishima Churyo was an ardent student of Dutch learning and also a close friend of Isaac Titsingh. In addition to *Komo zatsuwa* he also

- produced *Bangosen* (Collection of barbarian words) (1798) and *Bankoku shinwa* (New tales from everywhere) (1789 and 1800). The latter contains brief descriptions of various countries of Europe and Asia plus illustrations taken from F. Valentijn, *Oud en Nieuw Oost-Indie*.
- 10 *Biblia naturae etc.*, – *Bijbel der natuure, of historie der insecten . . . verrykt met ontelbare waarneemingen van nooit ontdekte zeldzaamheden in de natuur. Hierby komt een voorr. waar in het level van der auteur beschreven is door Herm. Boerhaave. De Lat. overz. heeft bezorgt Hier D. Gabius, 2 dln. Lat. en Holl.* (Leyden, 1737, 38.)
- 11 M. Honda, 'The "Red-Haired" Occidentals; described by a Japanese scholar in 1787', 241.
- 12 Quoted in Krieger, op. cit., 86.
- 13 *Gazophylacium medico-physicum, of schatkamer der genees- en natuurkundige zaaken, behelzende de meeste konstwoorden die in de geneeskunde gebruikelijk zijn.* . . (Amsterdam, 1741).
- 14 Quoted in Koga Jujiro, *Seiyo ijutsu denraishi* (History of the transmission of Western medical techniques), 359.
- 15 Quoted in Krieger, op. cit., 103.
- 16 Quoted *ibid.*, 112.
- 17 Most of this information on the translation bureau is taken from Shimamura Izuru, 'Ransho yakkyoku no sosetsu' (Establishment of an office for the translation of Dutch books).
- 18 There had previously been such officials as commissioner for the translation of Portuguese books (*Banshowagegoyo*) and commissioner for the translation of Dutch books (*Orandashoseki wagegoyo*).
- 19 Sajuro's extensive knowledge of Dutch is evident from such writings as *Teisei Rango kyuhinshu* (Revised collection of the nine parts of speech of the Dutch language) (1814) based on Shizuki Tadao's *Rango kyuhinshu*. (The nine parts of speech were: articles, nouns, pronouns, adjectives, adverbs, conjunctions, interjections, verbs, and prepositions.) Sajuro also wrote *Oranda bumpān tekiyo* (Summary of Dutch grammar) (1814) and *Rango kanri jiko* (The study of Dutch articles) (published in 1855).
- 20 Baba was knowledgeable in Manchu and Russian as well as Dutch, and he translated from Russian *Tonka hiketsu* (Preventing smallpox by vaccination). In 1813 he was sent to Hakodate by the Bakufu because of Russian incursions in the area.
- 21 The full title in Dutch was: *Algemeen huishoudelijk-, natuur-, zedekundig en kunstwoordenboek, vervattende veele middelen om zijn goed te vermeerderen, en zijne gezondheid te behouden, met verscheidene wisse en beproefde middelen voor een groot getal van ziekten, en schoone geheimen, om tot een hoogen en gelukkigen ouderdom te geraken; een menigte van manieren, om lammeren, schaapen, koeijen, paarden, muilezels, hoenderen, duiven, honingbijen, zij-wormen te kweeken, voeden, genezen en winst te doen met die dieren; eene natuurkundige beschrijving van huishoudelijk en wild gedierte, vogelen en visschen, en de middelen om dezelve te jaagen en te vangen; een oneindige menigte van geheimen in den tuinbouw, kruidkunde, akkerbouw, landbouw, wijngaard- en boomgaardbouw; gelijk ook de kennisse van vreemde gewassen, en haare eigenaartige krachten, enz. met de voordeelen van het distilleeren,*

verwen, zeepzieden, stijfsemaaken, schilderen met wateren olieverf, het maaken van baaijen en stoffen voor deeze en andere landen; van turf, steen, enz. al hetgeen een bekwame huishoudster dient te weeten, als het bereiden van allerlei soort van spijsen, dranken, gebakken, confituuren; het inmaaken van groentens voor de winter, enz. om chitsen en kanten in 't nieuw te wasschen enz. wat er in de slagttijd moet verrigt worden; het bereiden van meed, cyder, aalbesienwijn, ratafia, velerlei soorten van liquers enz. de middelen waarvan zich groote kooplieden bedienen, om grooten handel te drijven. een korte schets van de meesten kunsten, wetenschappen en handwerken. voorts alles, wat handwerklieden, tuiniers, wijngaardeniers, kooplieden, winkeliers, bankiers, commissarissen, overheeden, officiers van 't gerecht, edellieden, geestelijken, en andere luiden van aanzien, in de eerste bedieningen doen moeten, om zig welvarende te maaken. Tweede druk geheel verbeterd, en meer als de helfte vermeerderd door J. A. de Chalmot, en verscheidene anderen. Leyden en Leeuwarden 1768–1777. 7 deelen, 4°.

- 22 Because its main assignment was the translation of Chomel, the bureau was also called 'Chomel wage'.
- 23 The information on the de Chalmot edition of Chomel is taken from J. MacLean, 'The introduction of books and scientific instruments into Japan, 1712–1854', 22–5.
- 24 *Histoire naturelle avec la description du cabinet du roi* by Louis Marie Daubenton (1716–99); *Natuurlijk historie of uitvoerige beschrijving der dieren, planten en mineraalen, volgens het zamenstel van den Heer Linnaeus* by Martinus Houttuyn (1720–1798); *Thesaurus rerum naturalium* by Albert Seba (1665–1736); *Historia piscium* by Francis Willoughby (1635–1672); *Ornithologie ou description des oiseaux différens* by M. J. Brisson (1723–1806); *Beschrijving der Europische en Surinaamsche insekten* by M. S. Merian (1647–1717); *Huishouding, aart en eigenschappen der Nederlandsche vogelen, etc. met natuurlijke gekleurde afbeeldingen* by Cornelis Nozeman (1721–1786) and J. C. Sepp (1739–1811); *Natuurkundige uitspanningen* by J. Baster (1711–1775); and books by Aldrovandus (1552–1605), John Johnston, Anthonie van Leeuwenhoek (1632–1723), Jan Swammerdam, Rene Antoine de Reaumur (1683–1757) et al.
- 25 Shimmura, op. cit., 59.
- 26 In a list of those working in the Translation Bureau almost all the great names of the nineteenth-century *Rangakusha* appear (Numata Jiro, *Bakumatsu yogakushi* (History of Western learning at the end of the shogunate), 52).
- 27 Two other major projects of the Banshowagegoyo were: (1) Aochi Rinso's compilation of *Yochi shiryaku* (see below p.153) and (2) the translation of *Kaijohojutsu zensho* based on J. M. Calten, *Leiddraad bij het onderrigt in de zee-artillerij* (1832), a work carried out jointly by many scholars including Udagawa Genshin, Udagawa Yoan, Ozeki San'ei, Minato Choan (d. 1839), Sugita Rikkei (1789–1845), Takeuchi Gendo (1795–1880), Takasu Shotei (1814–1902), Mitsukuri Gempo, and Yoshio Chujiro (1788–1833) who became director of the Banshowagegoyo after the death of Baba Sajuro.
- 28 Koishi Genshun, an essentially Chinese-style physician who studied the

- kohoka* with disciples of Yamawaki Toyo, practised medicine in both Osaka and Kyoto after 1776. Genshun did not read Dutch but knew of Dutch-style medicine through such Japanese books as *Kaitai shinsho*.
- 29 *Pharmacopoea Galeno-Chemico-Medica probatissimis auctoribus, ratione & experientia fundata, of meng- schei- en geneeskonstige artsenij-wenkel, op de reden en de ondervinding gebout . . .* (Rotterdam, 1747).
 - 30 Miyasita Saburo, 'A bibliography of the Dutch medical books translated into Japanese', 55.
 - 31 *Tractaet van de siektens der swangere vrouwen, en der gene die eerst gebaert hebben. Aenwysende de rechte en ware maniere om de vrouwen in hare natuurlyke baringen wel te helpen, enz.*
 - 32 Quoted in Krieger, op. cit., 98.
 - 33 Based on parts of Petrus Nylandt's *De Nederlandtse herbarius of kruydt-boeck, beschryvende de geslachten, gedaente, plaetse, tijt, oeffeningh, aert, krachten en medicinael gebruyck van alderhande boomen, heesteren, boomgewassen, kruyden en planten enz.* (Amsterdam, 1670, 1680, 1682).
 - 34 Quoted in Krieger, op. cit., 91.
 - 35 *Pharmacopoea hodierna, ofie hedendaagsche apotheek, waarin de voornaamste en meest in gebruik zijnde geneesmiddelen, derzelver bereidingen, gebruik en kragten, beschreven, ook alle chemysche preparatiën geleert worden, met een voorafgaande uitlegging van de chemysche characters, de tekens van de maten en gewigten, alsmede een lijst van verscheidene enkelde, onder een naam begrepene geneesmiddelen; mitsgaders de hoe grotheid der giften, in 't Nederduits zamengesteld.*
 - 36 In addition to van Hamel's work, which Genshin used again for the last two volumes, he also gleaned data from *De nieuwe Nederduitsche apotheek gevende een duidelyk en klaar onderwys wegens de beste dagelyks gebruikte artseny-kundige bereidingen . . . in de apotheken vereischt, en volg. de gronden van Boerhaave*, [E.G.] Geoffroy [(1672–1731)] *e. a. beschreven* (Leiden, 1766);
 Kastelijjn, P. J., *Chemische oefeningen voor de beminnaars der scheikunst in het algemeen en de apothekers in 't bijzonder*, Amsterdam, 1783. Japanese version: *Kasshi seimi* (Kastelijjn's chemistry) by (Kastelijjn), 1788.
 Blumenbach, J. F., *Grondbeginselen der natuurkunde van de mensch. Uit het Latijn vertaald door G. Wolff*, Amsterdam, 1791. Japanese version: *Bushi jinshin kyurihen* (Blumenbach's investigation of human physiology) by (Blumenbach), 1791.
 Plenck, J. J., *Grondbeginselen der scheikunde. Uit het Latijn vertaald door J. S. Swann*, Amsterdam, 1803. Japanese version: *Fushi meiekiron* (Plenck's essay on clear liquids) by (Plenck), 1803.
 Lavoisier, A. S., *Grondbeginselen der Scheikunde. Iut het Fransch vertaald door N. C. de Fremery en P. van Werkhoven*, 1800. Japanese version: *Seimi gempon* (Basic chemistry) by (Lavoisier), 1806.
 Ypey, A., *Systematisch handboek der beschouwende en werkdadige scheikunde*, Amsterdam, 1804–7. Japanese version: *Ishi kogi* (A broad interpretation of Ypey) by (Ypey), 1804.
 Barneveld, W. van, *Over de geneeskundige electriciteit*, Amsterdam, 1789. Japanese version: *Ereki ryoho* (Method of treatment by electricity) by (Willem van Barneveld).

- Hagen, K. G., *Onderwijs in de grondbeginselen der apotheek. Uit het hoogduitsch vertaald door F. Breuker*, 1780, *Leerboek der apothekerkunst*, Amsterdam, 1793–9. Japanese version: *Yakuho shinan* (Instructions for a pharmacist) by (Hagen).
- Guition, Morveau, L. B., *Verhandeling over de middelen om de lucht te zuiveren*, Leiden, 1802. Japanese version: *Taiki shuzenho* (Methods of purifying the atmosphere) by (Guition Morveau), 1811.
- Trommsdorf, J. B., *Leerboek der artsenijsmengkundige, proefonderlijke scheikunde*, Amsterdam, 1815. Japanese version: *Goyaku seimi* (Chemistry and pharmacology) by (Trommsdorf), 1815.
- Segur, O., *Brieven over de grondbeginselen der scheikunde*, Rotterdam, 1811. Japanese version: *Seimi kankai* (Letters about chemistry) by (Octavius Segur), 1817.
- Van Houte, H. J., *Handleiding tot de materies medica of leer der geneesmiddelen*, Amsterdam, 1817. Japanese version: *Houta yakuron* (Van Houten's treatise on medicaments) by (Van Houten), 1817.
- Isfording, J. N., *Natuurkundig handboek voor leerlingen in de heel- en geneeskunde*, Amsterdam, 1826. Japanese version: *Rigaku shoho* (First steps in physics) by (Isfording).
- Hijmans, H. S., *Ontwerp van eene algemeene scheikunde*, Dordrecht, 1820. Japanese version: *Seimi gairyaku* (Outline of chemistry) by (Hijmans), 1820.
- Stratingh, S., *Scheikundige verhandeling over de chinchonine en quinine, bevattende eene opgaaft van der zelver verschillende bereidingen, eigenschappen, verbindingen, geneeskundig vermogen*. Groningen, 1822. Japanese version: *Kinaensetsu* (Explanation of quinine) by (Stratingh), 1822.
- Reinwardt, C. G. C., *Voorlezing over de hoogte en verdere natuurlijke gesteldheid van eenige bergen in Preanger Regentschappen 1823, in Verhandelingen van het Bataviaasch Genootschap IXe deel*, Japanese version: *Sokusansetsu* (Discussion of measuring mountains) by (Reinwardt), 1822.
- Nieuwenhuis, G., *Woordenboek*. Japanese version: *Nishi impu* (Nieuwenhuis dictionary) by (Nieuwenhuis).
- Nederlandsche apotheek*, 's-Gravenhage, 1826. Japanese version: *Oranda kyokuho* (Dutch pharmacopoeia), 1826.
- Richerand, A., *Nieuwe grondbeginselen der natuurkunde van den mensch uit het fransch vertaald door A. van Erpecum*, Amsterdam, 1826. Japanese version: *Rishi jinshinkyurihen* (Richerand's physiology) by (Richerand), 1826.
- Smallenburg, F. van Cats, *Leerboek der scheikunde*, Leiden, 1827. Japanese version: *Sushi seimi* (Smallenburg's chemistry) by (Smallenburg), 1827.
- Van de Water, J. A., *Beknopt doch volledig handboek voor de leer der geneesmiddelen*, Amsterdam, 1829. Japanese version: *Watoru yakuron* (Water's essay on medicines) by (Van de Water), 1829.
- Van Rees, *Verzameling van stukken als bijdragen tot het galvanismus, 200 inopsicht tot deszelfs genees als natuurkundige werkingen*, Arnhem, 1802–

5. Japanese version: *Garukani kiji* (Account of galvanism) by (Van Rees).
- 37 Like the other students who had worked at Shirando, Genshin was made familiar with the works of van Swieten by Otsuki Gentaku. Genshin himself had done a manuscript translation, *Ensei gunchu biyoho* (Essential methods of providing for [illnesses] in the military in the West), of the 5th edn (1780) of van Swieten's *Korte beschryving en geneeswys der ziekten, die veelzints in de krygs-heirleegers voorkomen*.
- 38 Twenty-one of these titles were listed in Dr. L. Serrurier, *Bibliothèque japonaise*, 213–14.
- 39 E. Shimao, 'The reception of Lavoisier's chemistry in Japan', 318.
- 40 Kure, 'Entfluss der Fremden insbesondere der Deutschen Medizin auf der Japanischen', 395.
- 41 Two of his principal Western sources were Pieter Goos (1615–75), *De zeeatlas ofte waterwereld, waer in vertoont werden alle de zee-kusten van het bekende des aerd-bodems* (Amsterdam, 1676), and the Dutch translation of Johan Hubner: *Die nieuwe vermeerderde en verbeterde kouranten-tolk, of zakelyk, historischen staatkundig woordenboek, waar in zo wel van den lateren als tot tegenwoordigen tyd de verscheide godsdiensten en geestelyke* (Leiden, 1748).
- 42 The word *wage* in the title *Haruma wage* comes from the tradition that when an examination was given in the official Bakufu Confucian school, Gakumonjo, the katakana written for *kambun* (Chinese writings) was called *wage*. Among the Nagasaki interpreters, interpreting was termed *Kuchiyawarage*. *Kuchi* is *kotoba* (word), and *Orandaguchi* is *Oranda kotoba* (Dutch word). *Yáwarageru* means *Iikaeru*, i.e. changing Dutch words into Japanese. This was abbreviated as *yawarage*. *Yawara* used the character 和 and *ge* was written 解, and the combination of the two came to be read *wage*. Finally this was thought to mean 'Wago de toku' (To make understandable in Japanese). (Otsuki, 'Edo jidai no Rangaku', 487.)
- 43 Quoted in Otsuki Fumihiko, 'Oranda jiten bunten no yakujutsu kigen' (Origins of the translation of Dutch grammars and dictionaries), 191–3.
- 44 Itazawa, 191–3. op. cit., 583.
- 45 For further reference the Japanese translators referred to the aforementioned Marin's *Woordenboek der Nederduitsch Fransch taalen, Dictionnaire Flamand et Francois* (Amsterdam, Utrecht, 1729) and Samuel Hannot's *Nieuw woordenboek der Nederlandsche en Latynsche taalen* (Amsterdam, 1719). It is not certain which editions of Marin and Hannot were used by the Japanese. Marin went through several editions between 1743 and 1783, and an augmented edition of Hannot prepared by David van Hoogstraten (1658–1724) was published at Amsterdam and Dordrecht (1704).
- 46 T. Yoshida, 'The Rangaku of Shizuki Tadao', 138.
- 47 Miyasita, op. cit., 38.
- 48 Yoshida Tadashi, 'Naka Tenyu no Rangaku' (Naka Tenyu and Rangaku).
- 49 A complete translation of *Verhandelinge van de uitwerpingen des menschenlyken lichaams, bestaande in pis, afgang, sweet, kywl en braaking, waar*

- nevens aangevoegd is een verhandelinge van de menschelyke gematigdheden in maatgedicht (Amsterdam, 1706; Rotterdam, 1731 and 1756).
- 50 *Practyk der medicine, synde eene korte beschryvinge der meestvoorkomende siektens, met haare bygevoegde geneesingen* (Haarlem, 1710, 1712, 1729 and Rotterdam, 1743).

CHAPTER XII WESTERN LEARNING IN VARIOUS DOMAINS

- 1 A title given to an administrator of one of the shogun's direct holdings.
- 2 Quoted in Itazawa Takeo, *Rangaku no hattatsu*, 84.
- 3 J. Murdoch and J. H. Longford, *A History of Japan*, 528.
- 4 Quoted in G. B. Sansom, *The Western World and Japan*, 254.
- 5 *Ibid.*, 254–5.
- 6 *Handboek der materies medica, ofte aanwijzing der kenteken en kragten der voornaamste geneesmiddelen* (Amsterdam, 1811, 2e ver. uitg., Amsterdam 1818).
- 7 *Geneeskundig handboek. Naar het hoogd. door M.C. Meppen. 2 dln.* (Amsterdam, 1817–32, 2e verm. dr. 1824–7).
- 8 *De geneeskundige leidsman, of huisselijke geneeskunde, bestaande in eene praktische verhandeling over de voorkoming, verschijnselen, oorzaken en geneeswijze der ziekten van het menschelijk ligchaam. Naar den 7en, in 1810 uitg., dr. uit het Eng. vert. 2 dln.* (Amsterdam, 1811).
- 9 *De horenvliessteek (keratonyxis, punctio corneae). Eene nieuwe methode om de cataract to opereren, benevens eenige ophelderende verhalen van gedane operatien.* Uit het Hoogd. vert. en vermeerderd door W. Mensert (1780–1848) (Amsterdam, 1812).
- 10 *Siphra en Pua; of onderwijzing in de vroedkunde en derzelver voornaamste handgrepen, nevens dertig gewigtige waarnemingen omtrent zware verlossingen.* Naar den 3en dr. uit het Hoog- in 't Nederd. vert. door G. ten Haaff (1749–1800) (Amsterdam, 1753), 2e dr., 1768.
- 11 *Schets der geheele verloskunde, geschikt om derzelver grondbeginselen volkomen te leeren, 's- Gravenhage, 1774.*
- 12 *Algemeene geographie, of beschryving des geheelen aardryks; . . . Eerst ontworpen en merklyk voortgezet door den beroemden Johan Hubner. Daarna in het Nederduitsch vertaald met invoeging van al het merkwaardige van den Franschen druk. Vervolgens met eene gantsch nieuwe beschryving der Nederlanden en doorgaans met nieuw aanmerkingen verrykt, door Heer W.A. Pachiene [(1712–1783)]. Een nu op nieuwe over het geheel verbeterd, vermeerderd, aardryksbeschryving voorzien, door Ernst Willem Cramerus* (Amsterdam, 1769).
- 13 Numata Jiro, *Bakumatsu yogakushi*, 158.
- 14 Ryusho was greatly influenced by, and used for teaching his students, J. A. Tittmann, *Leerboek der heelkunde. Naar de laatste verb. Hoogd. uitg. vrij vert. en met aant. verm.* door A. van der Hout (3 dln, Amsterdam, 1816; 2e verm. dr., 1819; 3e dr., 1827).
- 15 See chapter XIII below.
- 16 Tsuji Zennosuke, *Zotei kaigai kotsushiwa*, 782.

- 17 Itazawa Takeo, 'Nichirankosho no kiko', in his *Nichiran bunka koshoshi no kenkyu*, 18.
- 18 See chapter XIII below.
- 19 Another name for Koyasan, a mountain in Kii famous for its many Buddhist temples.
- 20 Fukui Kyuzo, *Shodaimyo no gakujutsu to bungei no kenkyu*, 325.
- 21 The custom of taking Dutch names dated as far back as 1664. In 1716 the Ito family of Shimonoseki took the name 'van der Berg', and in 1826, the Sanobu family also of Shimonoseki took the name 'van Dalen'. Other names are listed in Itazawa, *Rangaku no hattatsu*, 84.
- 22 As a sequel, in 1822 Kamiya and the fief physician Oe Shunto published *Nieuwe gedrukt Bastardt wordenboek* (Newly printed dictionary of bastard words).
- 23 T. Yoshida, 'The *Rangaku* of Shizuki Tadao: the introduction of Western science in Tokugawa Japan', 306.
- 24 *Zee-Chirurgie of Matroozen-troost in zeer veel gebreken den Zeevarenden overkomende, en ook hoe dat den Scheeps Heelmeester tot hulp dezer qualen zig kan bedienen van enkele en t'zamengestelde middelen zoo uyt zyn Medicynkist als van Scheepsbehoefden, begrepen in dry deelen, alles in vragen en antwoorden tot voordeel der Leerlingen zamengesteld* (1e dr., Middleburg, 1721).
- 25 The greatest part of the information in this section is based on the article by Inoue Tadashi, 'Fukuoka han ni okeru Yogaku no seikaku' (Characteristics of Western learning in the Fukuoka domain).
- 26 This volume purported to be the record of the interrogations of four priests taken prisoner in 1643 on Chikuzen Oshima. One of the four was Guiseppe Chiara (Okamota Sanuemon) (see below).
- 27 Quoted in Inoue, op. cit., 149.
- 28 Quoted *ibid.*, 151.
- 29 Quoted in Kure, op. cit., 414–15.
- 30 Quoted in Inoue, op. cit., 154.
- 31 Quoted *ibid.* Actually, Kaempfer's idea about the genealogy of the Japanese was quite unique and might be referred to here:

that in the first Ages of the World, not long after the Deluge, when the confusion of languages at Babel oblig'd the Babylonians to drop their design of building a Tower of uncommon height, and occasion'd their being dispers'd all over the World, when the Greeks, Goths, and Slavonians departed for Europe, others for Asia and Africa, others for America, that then the Japanese also set out on their journey: That in all probability after many years travelling, and many incommodities endur'd, they alighted at this remote part of the World; that, being well pleas'd with its situation and fruitfulness, they resolv'd to chuse it for the place of their abode; that in all likelihood they spent many Centuries in a polyarchical way of Life, such as is led to this day by the Tartars, living in hoords, and wandering with their Cattle and Families up and down the Country; that being insensibly, and by degrees grown to be a numerous and powerful Nation, they thought it expedient for the good of the Country, and for their own safety, to deliver up the Government into the

hands of one Prince, and chose for their first Monarch the valiant Dsin Mu Ten Oo [Jimmu tenno (660–585 BC), supposedly the first emperor of Japan and founder of the reigning dynasty]; that consequently they are an original Nation, no ways indebted to the Chinese for their descent and existence, and that, tho' they receiv'd from them several useful Arts and Sciences, as the Latins did from the Greeks, yet they were never made subjects, and conquer'd, neither by them, nor by any other neighbouring Nation (Kaempfer. *The History of Japan*, I, 151–2.)

32 Quoted in Inoue, op. cit., 156.

CHAPTER XIII WESTERN LEARNING IN PRIVATE SCHOOLS

- 1 Quoted in J. Bowers, *Western Medical Pioneers in Feudal Japan*, 140–1.
- 2 Takahashi Shin'ichi, *Yogakuron* (Essay on Western learning), 181.
- 3 *Institutiones medicae in usus annuae exercitationis domesticos digestae ab Hermanno Boerhaave* (Leiden, 1708).
- 4 G. Achiwa, *Herman Boerhaave 1668–1738. His Life, Thought and Influence upon Japanese Medicine*, 190.
- 5 Sugita Rikiei's published translations included *Oranda gankashinsho* (New book of Dutch ophthalmology) (1815) based on J. J. Plenck's *Verhandeling over de oogziekten* (1787) translated from Latin into Dutch; *Baiso shinsho* (New book on syphilis) (1821), a translation of the second Dutch edition of J. J. Plenck, *Verhandeling over de venusziekten. Uit het Lat. vert. en met aenteekeningen, benevens, een korte verhandeling over den oorsprong der venusziekte, volgens A. R. Sanches* [(1699–1783)] vermeerd door Lamb. Nolst (Rotterdam, 1781 and 1787); *Oranda gekayoho* (Essential methods of Dutch surgery) (1831), a compilation based on J. J. Plenck's *Materia chirurgica, of verhandeling over de werking der middelen, die in de heelkunde gebruiklyk zyn*. Uit het Hoogduitsch vert. door Barth. Tersier [(d. 1824)] (Utrecht, 1772 and Amsterdam, 1808); and *Yoka shinsen* (New selections on surgery) (1832), a translation from the Dutch version of J. J. Plenck's *Compendium institutionum chirurgicum* (1776).
- 6 In 1831 Tsuboi Shindo had married the eldest daughter of Aochi Rinso.
- 7 Tekitekisai was one of Ogata Koan's appellations.
- 8 The school moved to Kaishomachi in 1843.
- 9 *Byogaku tsuron* was based primarily on the Dutch translation, *Pathologie, of ziektekunde*. D1. I. *Pathogenie*, from the German original of Hufeland with additions from such sources as the writings of P. C. Hartmann (*Ziekteleer*), C. Sprengel (*Handboek bevattende algemeene regelen ter behandeling der ziekten*), G. W. Consbruch (*Geneeskundig handboek voor practiserende artsen*) and J. H. Conradi (1780–1861) (*Handboek der bijzondere pathologie en therapie*), professor of Medicine at Marburg and subsequently at Gottingen.
- 10 Numata, *Yogaku denrai no rekishi*, 177. According to Sansom, *The Western World and Japan*, 451, in the twenty years prior to 1862 Koan had more than 3,000 students.
- 11 Quoted *ibid.*, 178.

- 12 Refers to the *Doeff Halma* Dutch-Japanese dictionary.
- 13 Quoted in Itazawa, *Rangaku no hattatsu*, 80-1.
- 14 Fukuzawa Yukichi, *Autobiography of Fukuzawa Yukichi*, 97.
- 15 Quoted in Numata, op. cit., 186.
- 16 The appointment of von Siebold to the Dutch factory coincided with an attempt by the minister for colonies to revive the moribund trade with Japan. To emphasize to the Japanese the importance which the Dutch attributed to his mission, von Siebold was given a special title: *De Chirurgijn Major, belast met het natuurkundig onderzoek in dit Rijk* (The Surgeon Major, who is charged with a natural-historical survey of this kingdom).
- 17 Gonnosuke had studied under Shizuki Tadao and had learned French from Doeff and English from Cock Blomhoff.
- 18 In 1849 Soken wrote and published *Gyuto shoko* (Brief treatise on cow-pox) about his introduction of smallpox vaccination together with the Dutch factory doctor Otto Mohnike.
- 19 Curiously von Siebold himself came from Nagasaki to Narutaki only once each week.
- 20 The provincial origins of von Siebold's students at Narutakijuku are an important indication both of the broad interest in Dutch studies throughout Japan and of the potential for the spread of von Siebold's teachings: Nagasaki 2, Hizen 4, Chikuzen 5, Bungo 3, Suo 4, Aki 2, Bingo 1, Bizen 1, Mimasaka 1, Iyo 1, Sanuki 1, Owari 1, Kaga 1, Awa 2, Ittchu 1, Echigo 1, Edo 1, Joriku 1, Uzen 1, Rikuchu 2.
- 21 The dissertations which were incorporated into von Siebold's *Nippon; Archiv zur Beschreibung von Japan*, Leiden, 1832-54 were:
Mima Junzo, *Oudste geschiedenis, mythologie, van het Japansche rijk en levens beschrijving van den eersten Mikado*.
Oka Kenkai, *Oorsprong van alle zaken, kunsten en wetenschappen op Japan*.
Takano Choei, *Bekendmaking van de Japansche en Indiansch godsdienstige kerken en tempelen te Edo*.
Takano Choei, *Beschrijving der Liu-kiu [Ryukyu] Eilanden*.
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Ito Keisuke, *Beschrijving van de 'magatama', of buigende juweel*.
Takano Choei, *Fragmenten tot de oudste geschiedenis van Japan*.
Other dissertations presented by friends and disciples of von Siebold were:
Katsuragawa Hoken (1797-1844), *Verzameling van plant en gewas*.
Kumaya Gouemon, *Bereiding der blauwe verf, 'aizome' genoemd*.
Ko Ryosai, *Kort schets over een versteende tand*.
Suzuki Shuichi, *Eenige aantekeningen over Japansche munten*.
Takano Choei, *De kunst bloemen en takken sierlijk in vazen te stekken*.
Takano Choei, *Zedeleer voor Japansche vrouwen enz*.

- Takano Choei, *Korte verzameling van de voortbrengselen in Japan enz.*
 Takano Choei, *Beknopte beschrijving over de Japansche en Chinesche geneesmiddelen.*
 Totsuka Seikai, *Rijst.*
 Ishii Soken, *Aantekeningen tot de afbeelding van eenige Japansche insekten.*
 Ishii Soken, *Beschrijving der Japansche spinkoppen.*
 Ko Ryosai, *Beschrijving van eenige op Japan voorkomende merkwaardige ziekten.*
- 22 In addition to *Nippon*, von Siebold produced *Fauna japonica* (5 vols, Leiden, 1833–50); *Flora japonica* (2 vols, Leiden, 1835–70); *Bibliotheca japonica* (6 vols, Leiden, 1832–7).
 - 23 Among Ryosai's publications were *Seii shinsho* (New book on Western medicine) (1827), a translation of the Dutch version of Consbruch's *Geneeskundig handboek*; *Kubai yoho* (Methods of treatment of syphilis) (1838), a translation of an annotated Dutch translation, *Nieuwe zekere geneeswijze der venusziekte in al hare verschijnselen bekend gemaakt*, from the German of K. H. Dzondi; and two works on pharmacology: *Yakuhin oshuroku* (Handbook for applying medicaments) (1826) and *Yakunoshiki* (Judging medicinal powers) (1836).
 - 24 The map was not the only prohibited item discovered in von Siebold's luggage. Also called into question was a *hàori* or man's kimono into which the shogun's hollyhock crest had been woven, a gift to von Siebold from Habu Genseki in exchange for some special eye medicine which von Siebold had given him. From other students of his, von Siebold had also been given and had retained such contraband as pictures of samurai and their weapons, portraits of the shoguns and sketches of shipbuilding equipment.
 - 25 Much of this information is taken from the records of the Department of Colonies of the Government of the Netherlands and is recorded in J. MacLean, 'Natural science in Japan. I. Before 1830'.
 - 26 Quoted in Doke Tatsumasa, 'Yoan Udagawa – a pioneer scientist of early 19th-century feudalistic Japan', 109.
 - 27 Von Siebold collected 2,000 samples of 500 kinds of living plant and of 800 kinds of dried plant; 187 specimens of 35 kinds of vertebrate animal; 827 specimens of 188 kinds of bird; 166 specimens of 28 kinds of reptile; 540 specimens of 230 kinds of fish. (T. Ogata, 'Von Siebold en de Japanse cultuur', 20.)

CHAPTER XIV RANGAKU AND TOKUGAWA INTELLECTUAL FERMENT

- 1 Quoted in Nagata Hiroshi, *Nihon hokensei ideorogii*, 218–19.
- 2 Ransui was the author of *Ryukyu bussanshi* (Record of products of the Ryukyu Islands) and *Nakayama denshinroku bussanko* (Treatise on products listed by Nakayama Denshin). In 1757, Ransui held the first *Bussankai* (Exhibition of products) in Japan, a practice which spread to all the large cities, and in 1763 he became Bakufu physician and en-

- couraged the cultivation of ginseng as a national product.
- 3 *Florilegii pars secunda, in qua agitur de praedipuis plantis et floribus fibrosas radices habentibus: nec non arboribus speciosis et odoriferis, quibus horti in utraque Germania decorantur.* . . .
- 4 Quoted in Nagata, op. cit., 296–7.
- 5 Much of his vitriol was contained in his *Hohiron* (Treatise on farts) (1774).
- 6 Cf. chapter X above.
- 7 Quoted in D. Keene, *The Japanese Discovery of Europe*, 105.
- 8 Quoted in Fujii Shin, 'Rangakusha no shiso naiyo ni tsuite' (About the content of the ideology of the Dutch scholars), 352.
- 9 Quoted *ibid.* That these attacks were having an effect may be gauged by the opposition which they aroused, e.g. the book *Bukkoku rekishohen* (Compilation of astronomical data in the land of Buddha) (1810) by the priest Entsu (1754–1834). Entsu advocated and defended Buddhist cosmological theories, anti-globalism, and the supremacy of traditional Indian thought. Entsu's views were, in turn, vehemently denounced by the distinguished surveyor Ino Tadataka in his *Bukkoku rekishohen sekimo* (A refutation of *Bukkoku rekishohen*) (1816).
- 10 Keene, op. cit., 105.
- 11 See chapter X above.
- 12 Quoted in Nagata, op. cit., 318.
- 13 Quoted *ibid.*
- 14 Quoted in Fujii, op. cit., 354.
- 15 Quoted *ibid.*, 349.
- 16 Quoted in Keene, op. cit., 92.
- 17 Knox, G. W., 'Ki, Ri, and Ten', 158.
- 18 Quoted *ibid.*, 159.
- 19 Quoted *ibid.*, 168.
- 20 Quoted in G. Elison, *Deus Destroyed: The Image of Christianity in Early Modern Japan*, 243.
- 21 Kumaya Gouemon was also responsible for financing the studies in Nagasaki of another of von Siebold's pupils and a close friend of Choei, Oka Kenkai. For his part, Kenkai sent Gouemon various kinds of useful and unusual items from Nagasaki and also made it possible for Gouemon to acquire Japan's first piano which had been the favourite instrument of von Siebold.
- 22 For a complete list of fifty-two works by Takano Choei on medicine, geography, history, the Dutch language, pharmacopoeia, chemistry, agriculture and military science, see D. C. Greene (ed.), 'Osada's life of Takano Nagahide', 488–92.
- 23 S. Sakamaki, 'Japan and the United States, 1790–1853', 14.
- 24 *Ibid.*, 15.
- 25 Quoted *ibid.*, 16.
- 26 There was actually a noted British missionary named Robert Morrison (1782–1834) who had been in China since 1807. However, since he had died some three years before the sailing of the *Morrison*, it is obvious that he had no connection whatsoever with the affair at hand.

- 27 Quoted in Kure, op. cit., 416.
- 28 For a complete English translation, see Greene (ed.), op. cit., 423–30.
- 29 Although this work was not published at that time (1839), its contents were widely known. (Tsuji Zennosuke, *Zotei kaigai kotsushiwa*, 778.)
- 30 Ozeki San'ei was also a victim of suicide at this time. It seemed that San'ei had worked together with Kazan on the translation of a Dutch *Life of Jesus Christ*. When San'ei heard of Kazan's arrest, he immediately surmised that it was a consequence of this collaboration. San'ei determined that death by his own hand was infinitely preferable to the probable penalty of crucifixion. (Greene (ed.), op. cit., 438–9.)
- 31 Quoted in Kure, op. cit., 416–17.
- 32 Rokuzo made a careful study of English grammar and in 1840 wrote *Eibunkan* (Mirror of English grammar).
- 33 Found in Mikami Sanji, *Edo jidaishi*, 666–70.
- 34 Quoted in Inobe Shigeo, *Bakumatsushi no kenkyu* (A study of the history of the end of the Bakufu), 669.
- 35 Quoted *ibid.*
- 36 Quoted *ibid.*
- 37 The southwestern portion of the island of Hokkaido which was assigned by Ieyasu to the Matsumae family.
- 38 Quoted in Krieger, *The Infiltration of European Civilization into Japan During the 18th Century*, 76.
- 39 Quoted *ibid.*, 81.
- 40 Quoted *ibid.*, 83.
- 41 Quoted in Keene, op. cit., 48–9.
- 42 Quoted *ibid.*, 53.
- 43 Samurai in the service of the shogun but inferior to the *hatamoto*.
- 44 Quoted in Kiyohara Sadao, *Edo jidai koki* (The latter part of the Edo period), 107–8.
- 45 *Ibid.*, 208.
- 46 Quoted *ibid.*, 209.
- 47 Quoted in Nagata, op. cit., 313.
- 48 Quoted in Kiyohara, op. cit., 209.
- 49 Kobayashi Shojiro, *Bakumatsushi* (A history of the end of the Bakufu), 143–4.
- 50 Quoted in Krieger, op. cit., 79–80.
- 51 A coastal province of China.
- 52 Kurita Motoji, *Edo jidaishi*, 354.
- 53 Tsuji, op. cit., 772–3.

CHAPTER XV CONCLUSION

- 1 Professor Numata quotes an 1853 catalogue of translations and original writings by scholars of Western learning as listing 486 titles by 117 translators and authors. (Numata Jiro, 'Dutch learning (*Rangaku*) in Japan. A response pattern to the foreign impact', 66.)
- 2 Hirose Genkyo was descended from a family of physicians from Kai. Genkyo studied with Tsuboi Shindo and became a Dutch-style physician

at Kyoto where he also taught chemistry and translated books on military matters.

- 3 A. Craig, 'Science and Confucianism in Tokugawa Japan', 150.
- 4 In the premicroscopic era, before the structure and functions of cells was understood, Boerhaave believed that the body was composed of 'threads' (*faser*) and that disease affected these threads and had to be treated accordingly.
- 5 The Brunonian system claimed that all diseases could be classified as either 'sthenic' or 'asthenic' and could be treated by one of two methods, stimulant or sedative.
- 6 Quoted in Itazawa Takeo, *Nichiran bunka koshoshi no kenkyu*, 300.
- 7 It has been suggested that surgery and ophthalmology were excepted since they were easier to inspect and control than other medical specializations.
- 8 There was, of course, no 'Japanese studies' movement in Holland. In fact, although the Dutch had benefited from their exclusive foothold in Japan for over two centuries, the first chair in Japanese in Holland was established at Leiden University in 1855.
- 9 Fukuzawa Yukichi, *Autobiography of Fukuzawa Yukichi*, 105.
- 10 H. Rosovsky, *Industrialization in Two Systems*, 104–5.

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Abbreviations *RC* (*Rekishi Chiri*) (Historical geography)
used: *SZ* (*Shigaku Zashi*) (Journal of the study of history)
TASJ (*Transactions of the Asiatic Society of Japan*)
TJSL (*Transactions and Proceedings of the Japan Society of London*)

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